EXCAVATING ENGINEER

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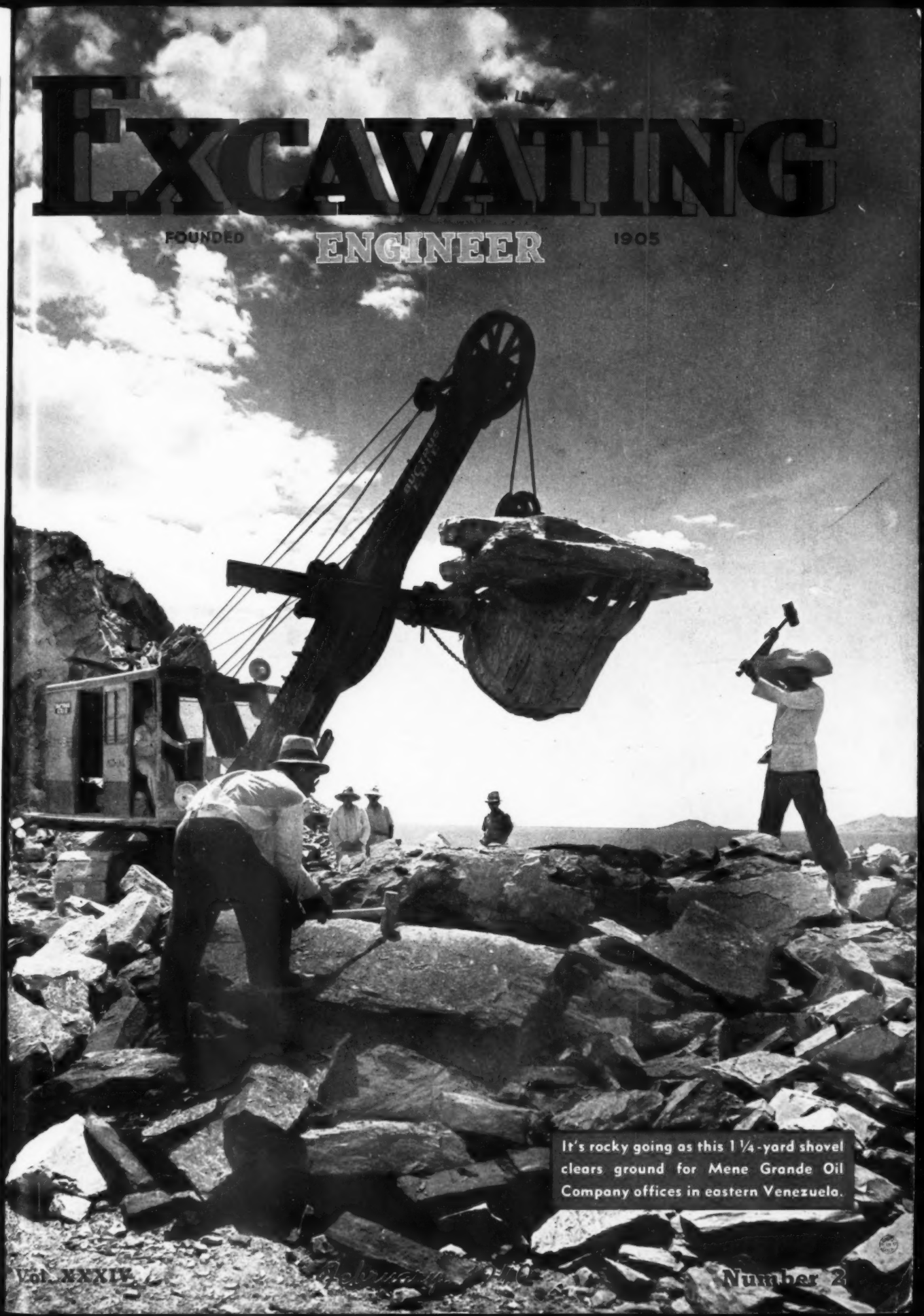
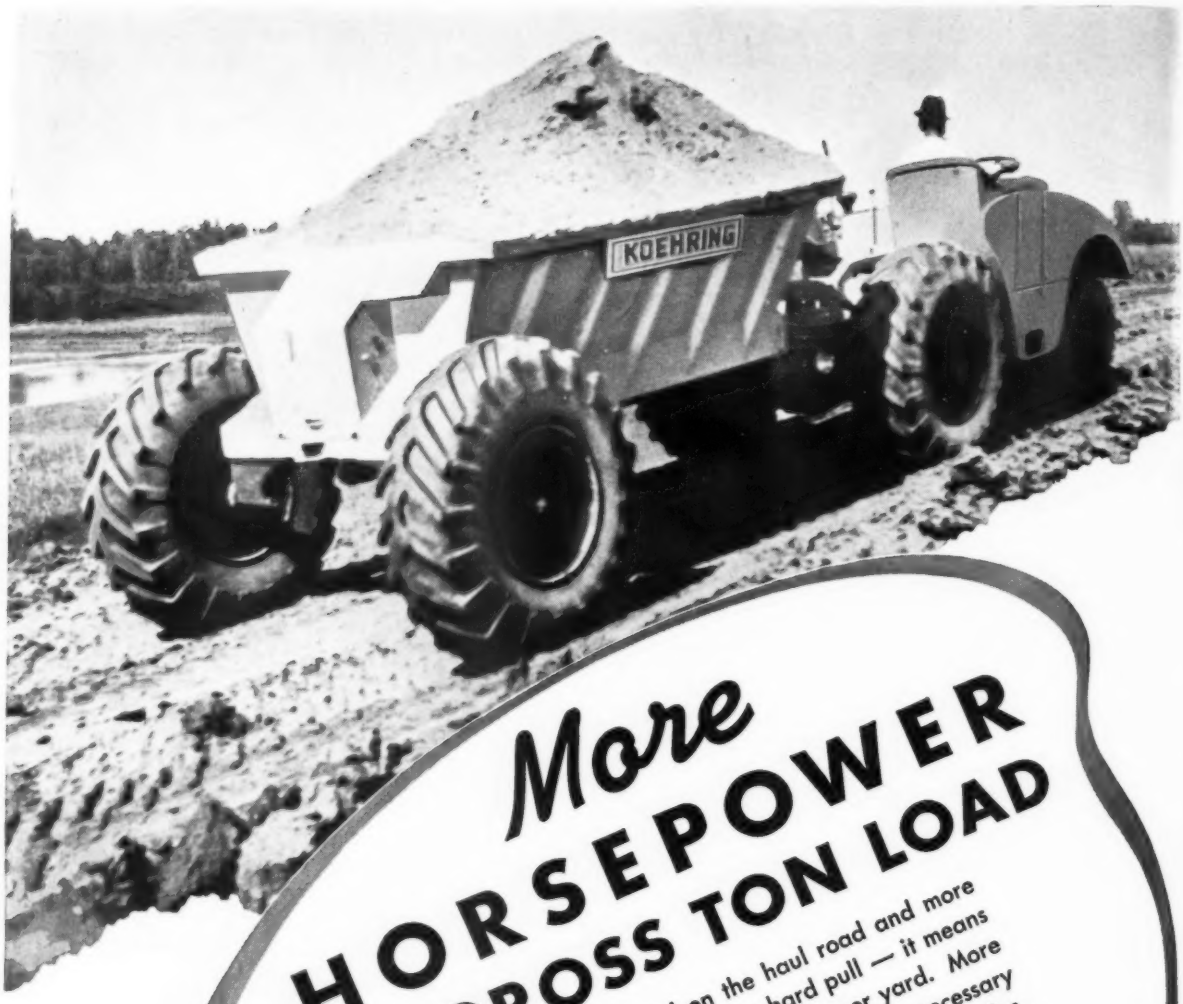


It's rocky going as this 1 ¼-yard shovel clears ground for Mene Grande Oil Company offices in eastern Venezuela.

Vol. XXXIV February 1944 Number 2



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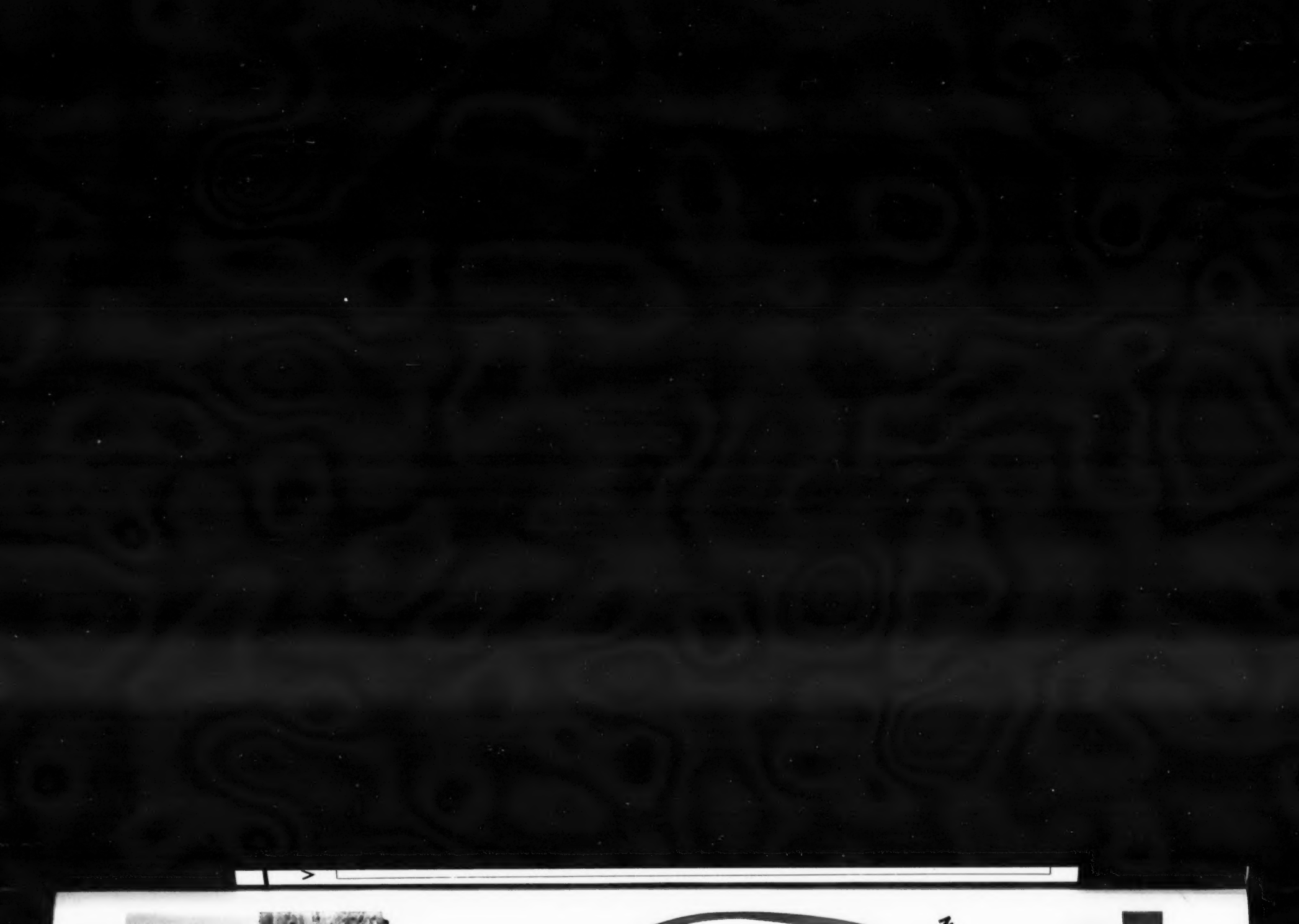
KOEHRING HEAVY DUTY

HEAVY-DUTY CO[illegible] EQUIPMENT



V

EXCAVATING ENGINEER

FOUNDED 1905

contents

Vol. XXXIV **February, 1940** No. 2

February Advertisers

American Chain & Cable Company .....3rd Cover
Atlas Imperial Diesel Engine Company 109
Bargain Counter 135
Bucyrus-Erie Company ....88, 113, 119, 125, 129, 4th Cover
Bucyrus-Monighan Company .. 82
Caterpillar Tractor Company .. 89
Differential Steel Car Company 116-117
Ensign-Bickford Company, The 84
For Sale Advertisements...133-134
General Electric 120-121
Haiss Manufacturing Company, George 124
Hayward Company, The 136
Hercules Motors Corp. 105
Hercules Powder Company ... 115
Ingersoll-Rand Company 127
International Correspondence Schools 136
International Harvester Co. ... 111
Koehring Company .....2nd Cover
Leschen & Sons Rope Co., A... 123
R. G. LeTourneau, Inc. 85
Macwhyte Company 81
Owen Bucket Company 130
Roebling's Sons Co., John A... 136
Rogers Brothers Corporation... 128
Sauerman Brothers 126
Socony-Vacuum Oil Company, Inc. 106-107
Standard Oil Company of California 86-87
Suckert Loose-Leaf Cover Co... 136
Wellman Engineering Company, The 122

Turnpike Contract 90

A complete description of a typical section of Pennsylvania's famed $70,000,000 "all weather" turnpike.

Florida's Treasure Island—By L. H. Houck 94

Hillyer and Lovan of Jacksonville construct a causeway to Florida's permanent seven million dollar Treasure Island.

Digging for Cement 98

A visit to the Louisville Cement Corporation's Speed, Indiana plant reveals some interesting and modern cement rock handling operations.

Editorial 102

Construction Outlook for 1940.

Not in the Contract 104

Equipment You Ought to Know About 108

B-E Scraper 108
Tractor-Trailer 108
New "Caterpillar" Tractor. 108
Roll Crusher 110
LeTourneau SU Scraper ... 110
Hough Tractor Sweeper ... 110
Ransome 34-E Paver 110
18-yd. Euclid Scraper 110
New Hydraulic Hoist 110
More About Desert Sluice.. 112
New Jaw Crusher 112
New Trackson Model 112
Drifter Rock Drill 112

Field Notes 114

What to Do for a Wound.. 114
Tank Straightening Hint .. 114
Blue Print Holder 114

Shots From the Firing Line 118

Federal Highway Allotments 118
Sand and Gravel Meeting.. 118
N. J. Engineers Urge Diversion Ban 118
NCSA Convention 122
Final Grade Operations at Fort Peck 122
Professional Engineers Convene 123
Extend Contra Costa Canal 123
Elect N. Y. County Assn. Officials 123
Draining Cripple Creek Gold Field 124
Madera Canal Contract Let 124
Ohio Mine Fire Caged 126
Annual AGCA Convention. 128

Obituary 128

John West Macmeeken

Trade Notes 132

Book Reviews 132

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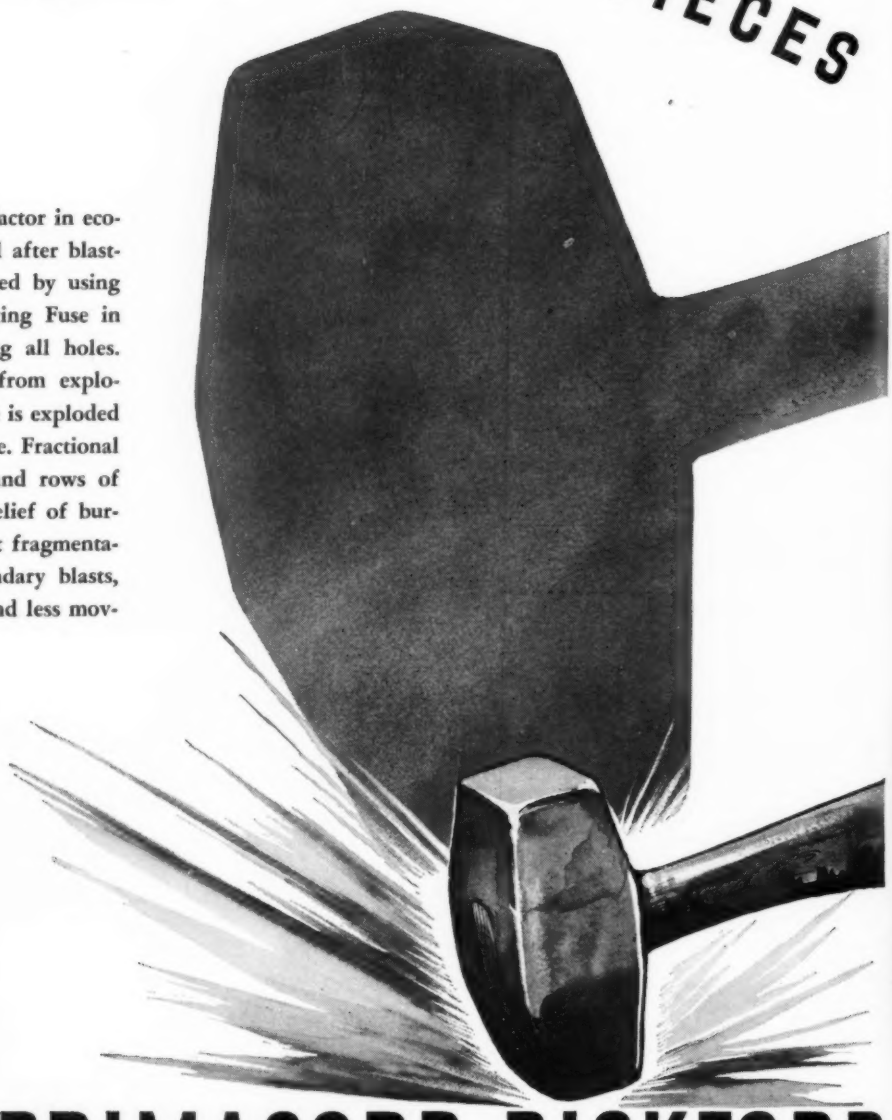

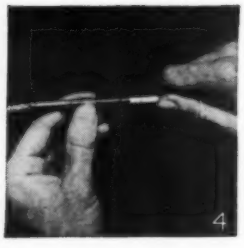

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And here's how it's done: The "Caterpillar" Diesel uses only a few gallons of low-cost fuel for a day's work. And when it comes to the money-savings, *that* counts for a lot!

Now, let's look at the loads and time. With 26 yards in the wagons, the "Caterpillar" Diesel Tractor completes a 2200-foot round trip —loading, hauling, dumping and turning—in only 14½ minutes!

The answer, of course, is power and traction . . . with tracks playing a *double* part. Because they're under the load as well as under the power! Yet the *tractor's* tracks deserve special mention. For it is they that take a maximum of the engine's power and convert it into drawbar-pull—up-hill and down, over mud, sand, soft earth and rock. And it's the maneuverability they give the outfit that saves time on turning and spotting!

If you've got a hauling job—and your costs are too high—see your "Caterpillar" dealer!

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TURNPIKE CONTRACT

Pennsylvania's famed turnpike is the creation of many individual contractors. Typical of the hard-working group that made this super highway possible is Frank Mashuda of Milwaukee

IN presenting a general account of the world's greatest road building job for 1939 and '40 —Pennsylvania's $70,000,000* "Dream Road"—it is easy to lose sight of the countless day-by-day problems faced by the individual contractor on his assigned section of this record breaking highway project.

Although Excavating Engineer has already featured a full length article on the Pennsylvania Turnpike (see October, 1939) it is happy to present the following—a "method" account of the operations on a typical turnpike contract.

*A recent appropriation by Pennsylvania has increased the original Turnpike fund of $61,000,000 to assure satisfactory completion of the project.

Mashuda's 4.1 Mile Section

From Station 1197+50** (a point approximately 1.5 miles northeast of Laurelville) to Station 1414+17 (a point 2.5 miles northwest of Donegal) in Mt. Pleasant Township, Westmoreland County, Pennsylvania, Pennsylvania Turnpike engineers laid out a crooked but nevertheless gently curving line for 4.1 miles of Pennsylvania's "Dream Road." In general the line follows Jacob's Creek in a southeasterly direction, rising almost five hundred feet in 4.1 miles. Four crossings of the creek were required, two others eliminated by a major channel change, with eleven other lesser channel changes required to train the creek to the needs of the new road.

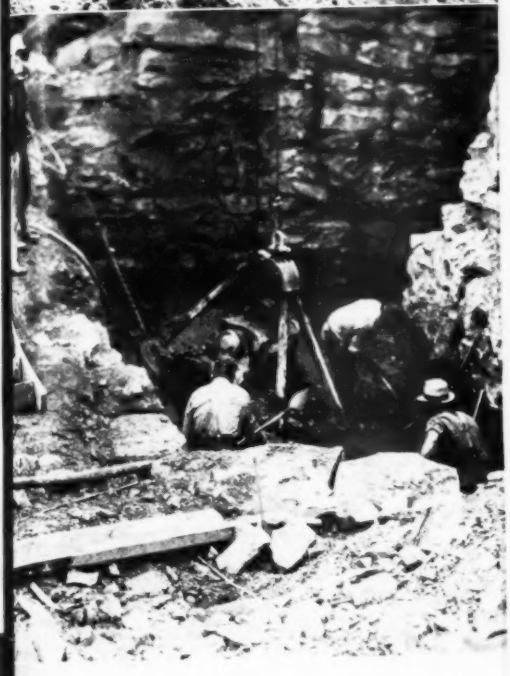
This section between wooded hills, awarded to contractor Frank Mashuda, Milwaukee, presents a typical side hill turnpike grading job—picturesque and tough. A plot of about 10 acres of ground south of the turnpike line and adjacent to a township road not far from Acme, Pennsylvania, was

**See sketch on pages 100, 101 for location of this station and others that are mentioned.

● General excavation view of a side-hill cut on the Mashuda contract. Jacob's Creek is at the right.

● A 'dozer cuts a bench on a side hill cut in preparation for shovel operations.

● A rocky section of the roadway is handled by a Bucyrus-Erie 1¾-yard shovel.



● Digging out a bridge footing in shale and clay on the C. B. Taylor contract.

● Inlet drainage structure to catch water on uphill side of the turnpike.

● An Allis-Chalmers powered Adams leaning wheel grader finishes a slope.

● Drainage pipe under turnpike empties into spillway on downhill side of roadway.

● Frank Mashuda actively supervised the excavation operations on his Pennsylvania Turnpike contract.

rented for a campsite. Here Frank Mashuda established "Mashudaville," a miniature village with complete facilities consisting of shops, bunk houses, kitchen, mess hall, office and several individual dwellings for staff members and their wives. The women in camp, true to their natural instincts, soon began to beautify the camp ground around their dwellings with potted flowers and native shrubs which were transplanted and nursed into survival in their new locations.

Most of the camp houses in "Mashudaville" are on wheels for quick and easy moving, and were shipped to Pennsylvania by rail from the last Mashuda job in Wisconsin.

Clearing the Right-of-Way

Clearing of Mashuda's section of the right-of-way started on May 19, 1939 with from 45 to 50 men working about seven weeks on this task. All slashed underbrush and small trees were burned on the road site. Stumps had to be cleared and all perishable material was taken off the right-of-way and burned or properly disposed. Special attention was given to cleaning up on both sides so that unsightly piles of refuse would not line the finished highway.

The first equipment on the job consisted of Caterpillar Diesel tractors with LeTourneau bulldozers and angledozers. Six of these 'dozers were used on the job mounted on RD8 and RD7 tractors. Since about 75% of the entire contract was side-hill excavation, the start of the digging at almost all the stations consisted of the proper slope treatment, with bulldozer or angledozer. Occasionally deeper cuts called for hand finishing of the slope. As soon as the bulldozers had cut in enough to make a shelf for scrapers or shovels, these were brought in to get the dirt moving in full swing.

Shovel excavation started with a Bucyrus-Erie 2-yard Diesel shovel at about station 1358+20 where a township road near the campsite crosses the turnpike right-of-way. A cut of about 35 feet was required here, but because crossings of Jacob's Creek lay both east and west of the cut making it necessary to await the completion of the structures, all the shovel did in this cut at the start was to dig out enough to make room for the reinforced concrete rigid frame bridge to carry the township road over the turnpike. During construction of the bridge local traffic was detoured over a temporary road on the high ground a few feet west of the bridge construction operations.

North of the turnpike, a thousand feet or so, the township road crosses Jacob's Creek over a rustic-looking bridge and here, down-creek, was "the old swimmin' hole" at Freeman's Falls. Nearby residents had built about this scenic spot a number of summer cottages. Here was "Mashudaville's" suburb, the summer cottages having been rented to tractor skinners, shovel operators, grade foremen and so forth who had moved their families to the job.

Heavy Excavation Started On Western End

With the digging held up by the necessity of waiting for structures over Jacob's Creek near the township road which passes "Mashudaville," the job was opened up both to the east and west where longer hauls offered more freedom for cut and fill operations. Early excavating operations called for changing the channel of the creek and a Bucyrus-Erie 48-B 2¼-yard shovel powered by a Buda Lanova 6 cyl. 6½ x 8¾ Diesel engine was unloaded from a trailer on the township road just north of the bridge at Freeman's Falls and started making its own road west along the creek to the turnpike line.

Below Freeman's Falls the 48-B waded the creek for almost two miles making ten channel changes involving about 25,000 cubic yards of excavation. The largest of these channel relocations handled by this machine (Sta. 1329-1333) required about 3,700 yards of rock and earth digging. Two others totaled 3,100 yards (Sta. 1308-1312) and 3,070 yards (Sta. 1218-1222) while the remainder involved lesser yardage figures down to a channel widening of 100 yards at Sta. 1342—1343. The 48-B experienced no trouble in walking up and down the channel in this work.

Major Channel Changes

One channel change west of Freeman's Falls (Sta. 1236—1240) involving about 1,500 yards of Class I excavating was put in by Frank Mashuda's Bucyrus-Erie 37-B working as a shovel. This Caterpillar-Diesel powered 1¾-yard shovel, about 3 years old, was brought in from Wisconsin, and with the exception of a Bucyrus-Erie 10-B ⅜-yard shovel purchased later on, completed the shovel equipment brought in by the contractor.

Working as a dragline, the 37-B made the major channel change east of Freeman's Falls (Sta. 1369—1380), involving over 7,600 yards of excavation. It is interesting to note that part of this channel change had to be filled in for a local resident who had built some cottages on an elbow of Jacob's Creek and objected to the river being taken away from his door!

One of the heaviest cuts on the Mashuda contract, 75 feet on the bank side, was encountered just below Freeman's Falls (Sta. 1325—1340). As in all cuts LeTourneau angledozers or bulldozers opened up the side hill at the top of the cut and cleared a shelf for the hauling equipment. Where material was suited, LeTourneau Carryalls of 12 cubic yards capacity were put to work. Five of these scrapers were available and with both scrapers and shovels on the job it was not unusual to see digging going on two or three benches in one cut at the same time. On the lower bench where most of the rock was encountered shovels loaded to one of the three Athey

16-yard wagons or several of the ten 6-yard Sterling trucks on the job. Cuts were taken out in about ten to fifteen foot benches and on steep slopes the contract called for fills to be benched in 10-foot layers to give proper binding to the filled material.

As on all turnpike contracts, fills were rolled to provide proper settlement for spring paving which will follow. For this work Frank Mashuda had five 10-ton Buffalo-Springfield rollers. Oversize rocks were broken to six inches and under by a Koehring crane swinging a 4,000-lb. "skull-cracker" before the fill was rolled. In the early stages of the excavating all oversize rock was placed on the creek bank to prevent washouts. A layer of rock three feet thick was thus placed as a protection for the completed roadway.

Continuing west from the large cut just below Freeman's Falls, other cuts on the Mashuda contract ranged up to 75 feet. Two 60-foot cuts were handled, one 50-foot, and three between 30 and 40 feet. Fills, from the largest (Sta. 1207 and 1219) which were 45 feet, ranged downward to three cuts with no fill at all. Two fills ran to 35 feet and four as deep as 30 feet.

On the entire job, through cuts —that is, where the profile on both right and left was above grade— aggregated only about 5,000 feet. All fill to finished grade amounted to only slightly more than 4,000 feet. All the rest of the contract was side-hill work, cut on one side and fill on the opposite.

Description of Major Structures

Six major structures — two bridges carrying township roads over the turnpike and three arches and one rigid frame bridge to permit passage of Jacob's Creek— were subbed to contractor A. R. Coffeen of Decorah, Iowa. Four of these structures were again sublet to three more contractors; one arch to L. J. Luteri, Somerset, Pennsylvania; one bridge and one arch to C. B. Taylor of Decorah, Iowa; and one arch to Roy McLaughlin, Pennsylvania. The remaining structures, one overhead for a township road overpass and the rigid frame bridge over Jacob's Creek, were put in by subcontractor Coffeen of Iowa.

Descriptions of the structures are as follows:

McLAUGHLIN'S ARCH. Sta. 1348+13. Reinforced concrete. Span 28 feet 4 inches. Length 113 feet 2½ inches. Skew 75° left. 13 feet 0 inches clearance actual and nominal. 293 cu. yds. Class A concrete. 286 cu. yds. Class B concrete. 18,772 lbs. plain steel bars. 16 cu. yds. stone backfill. 220 cu. yds. Excavation Class I. 700 cu. yds. Excavation Class II. 47 cu. yds. Channel Excavation Class I. An old Erie steamer of ¾-yard capacity handled the excavation and placed the concrete for this arch, but since it was finished at the time of our visit, the other equipment used in its construction had been moved.

COFFEEN'S BRIDGES. Sta. 1358+20. Reinforced concrete. Span 78 feet 0 inches. Actual clearance, 14 foot minimum. Skew 75° left. Roadway 20 feet. 489 cu. yds. Class A concrete. 175 cu. yds. Class B concrete. 123,230 lbs. plain steel bars. 10 cu. yds. stone backfill. 186 sq. yds. reinforced concrete wearing surface for bridge floor. 250 cu. yds. Class I excavation. 97 cu. yds. Class II excavation. Coffeen's second bridge is a reinforced concrete T-beam structure. Sta. 1359+72. Span 26 feet 0 inches. Clearance nominal and actual 11.76 feet. Skew 90°. 70 foot roadway. 103 cu. yds. Class A concrete. 333 cu. yds. Class B concrete, 39,070 lbs. plain steel bars. 10 cu. yds. stone backfill. 310 cu. yds. Class I excavation. 396 cu. yds. Class II excavation. 2,447 cu. yds. channel excavation Class I.

TAYLOR'S ARCH. Sta. 1381+25. Span 39′0″/38′7″ nominal clearance 22′10″/20′4″. Skew 60° left. Length 119 feet. Actual clearance 16.5 feet 467 cu. yds. Class A concrete. 436 cu. yds. Class B concrete. 58,683 lbs. plain steel bars. 16 cu. yds. stone backfill 1,030 cu. yds. Class I excavation. 1,347 cu. yds. Class II excavation. 2,246 cu. yds. Class I channel excavation.

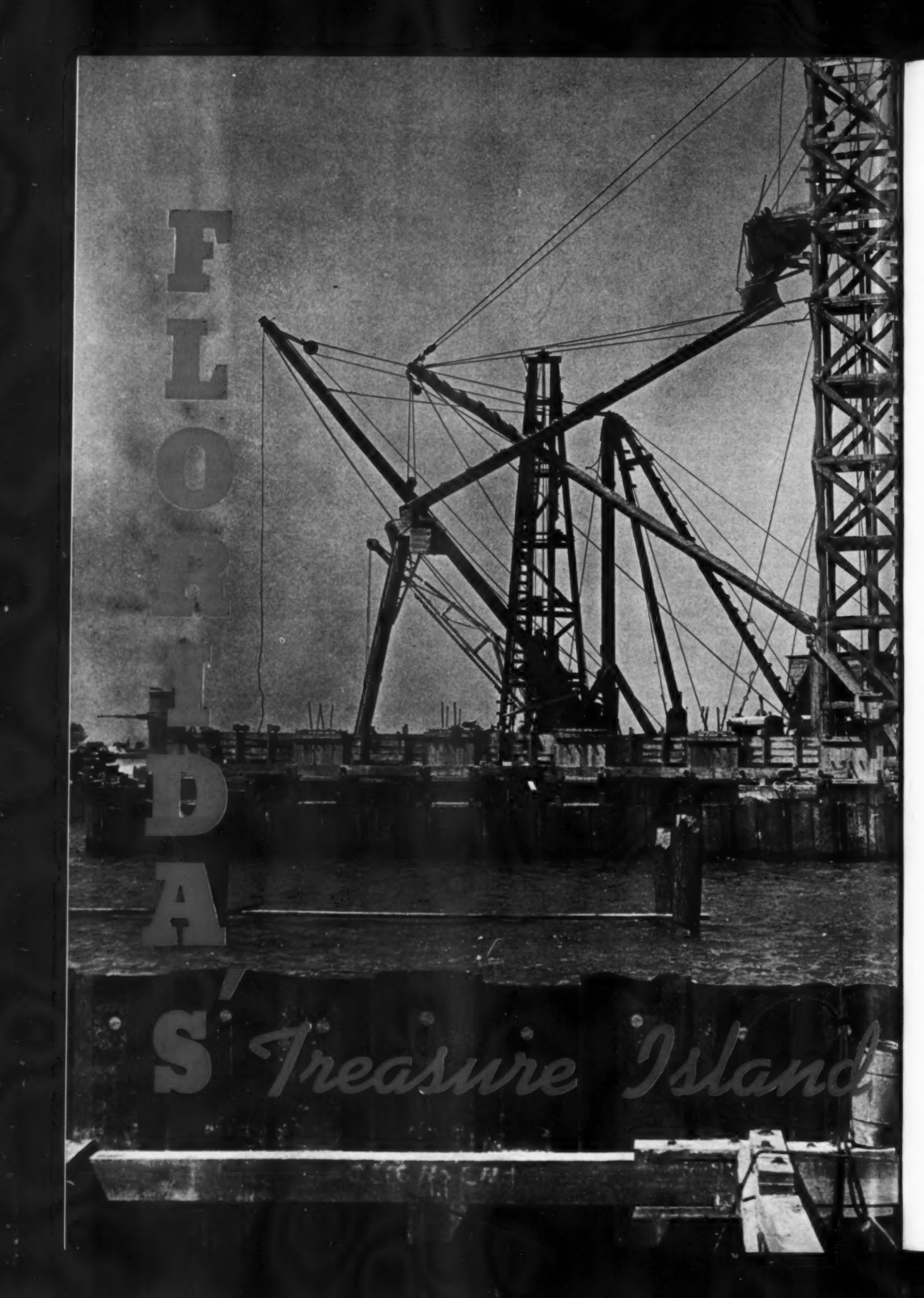
TAYLOR'S BRIDGE. Sta. 1385+75. Originally this was planned to be a duplicate of Coffeen's bridge (at Sta. 1358+20) on the same skew with 6 cu. yds. additional Class A concrete and 32 cu. yds. less class B concrete. However, due to unforeseen conditions the Turnpike Commission felt obliged to redesign this overpass. At the time of our visit plans and specifications were not available.

For both arch and bridge, subcontractor Taylor used his Model 40 Lorain clamshell in completing the excavations and placing the concrete.

LUTERI'S ARCH. Sta. 1413+37. Reinforced concrete. Span 38 feet 10 inches. Actual clearance 15

(Continued on Page 100)

● **Assisted by a Cat-mounted LeTourneau 'dozer, a Bucyrus-Erie 2¼-yard shovel makes a channel change in Jacob's Creek.**


FLORIDA'S
Treasure Island

Hillyer and Lovan of Jacksonville build a causeway for Florida's permanent seven million dollar Treasure Island.

By L. H. HOUCK

TREASURE Island may be a place where California is holding a world's fair but there are at least two other well know Treasure Islands. One, a book by Robert Louis Stevenson, and the other is Treasure Island, Florida, an incorporated town on one of Florida's celebrated gulf beaches only a short distance from St. Petersburg.

This Florida resort is the site of a seven million dollar expansion program, which includes bridges, causeways, apartment buildings and hotels. As a part of the cost of a new toll bridge, causeway and fills, being built between Treasure Island and St. Petersburg, the Reconstruction Finance Corporation has loaned the city of Treasure Island $696,000, with the understanding the balance will be paid by the municipality. Other projects which swell the construction to near the seven million dollar mark represent private capital.

Million Yard Fill

Not the least in importance is the proposed landscaping and reclaiming ground from the bottom of Boca Ceiga Bay, which involves a fill of more than a million yards.

Modern apartment buildings to be built at the west end of the causeway with improvements and innovations of tomorrow, will take more than $600,000. These will be built in staggered fashion so every room will have sea breezes and ocean views. Spread fan-like at the western terminus of the causeway, these imposing structures will be first to greet the motorists coming across the viaduct. Here the motorist's fondest dreams will be realized — for in front of him will be parking space for 5,000 automobiles.

The causeway is projected directly westward from Central Avenue in St. Petersburg and strikes the gulf islands about midway between the Corey Causeway to Pass-a-Grill and the Welch Causeway near Bay Pines. The bridge and the causeway is across Boca Ceiga Bay and a section of this waterway is a part of the West Coast Inland Waterway which is connected with the east Florida coast and the Atlantic Ocean through Lake Okeechobee.

Treasure Island is aptly named. Among its natural treasures is the celebrated tropical sunshine which shines almost every day in the year and the languid waters of the Gulf of Mexico, which lap contentedly at its shores. Winter visitors from all over the world dot these sands both summer and winter.

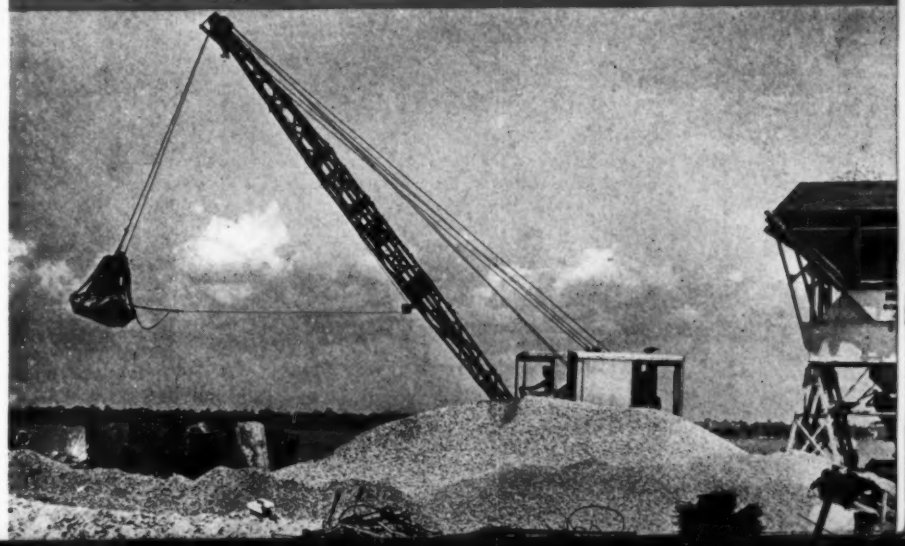
Improvement of facilities for entertainment of these thousands of visitors is the basis for the large improvement program. During the past season more people came to Treasure Island than the hotels and beach cottages could handle.

Construct 16,000 Foot Causeway

The first major activity to take place was the construction of the 16,000 foot causeway and bascule bridge by Hillyer & Lovan, of Jacksonville, Florida, who were awarded a contract amounting to $486,000. They spent the first 45 days assembling material and machinery. Draglines, of which they have three, consisting of two P.&H. rigs and a one-yard Bucyrus-Erie, were brought in by the water route from Jacksonville, through Lake Okeechobee and by

● Top (L to R): Henry Greene, RFC representative; C. E. Hillyer, contractor; George Axbell, general supt.; Roger Wilson, resident engineer.

● Bottom: Swinging a 1-yard clamshell this Bucyrus-Erie unloads gravel from barge to the automatic mixing hopper at right.



● Left: The barge-mounted cement mixing and pouring plant pours a batch into one of the large piers.

● Left: Loading cement on barge for mixing and pouring plant. Note cans for handling sand and gravel. Below: Finished ply-wood forms are painted with oil to facilitate removal.

inland water route to Treasure Island. Actual work on the job started about January, 1939 and was completed the following September.

Hillyer and Lovan are not strangers to the business of bridging water with concrete and steel. Davis Causeway which extends from Tampa to Clearwater, about 11 miles long, was one of their jobs, and it has become known in engineering circles all over the country.

Contract for the Treasure Island Bridge and Causeway, which will eventually liquidate itself through tolls, was let to Hillyer & Lovan by the City of Treasure Island.

Total length of bridge including approaches is 16,000 feet. The bridge is of reinforced concrete construction. Near the center there is an 80-foot double-leaf bascule. This counter-balanced drawbridge will provide passage for boats and ships along the inland waterway. All told, the structure contains 11,000 yards of concrete and 1,500,000 pounds of reinforcing steel, exclusive of steel used in the piers.

Each span contains an average of 17 tons of steel, and the wooden forms for each span required 17,000 feet of lumber. The roadway has a concrete surface 42 feet wide, sidewalk and railings extra.

Provision for piers required excavation to minus 21 feet and the building of cofferdams, which were made of steel piling. From 42 to 133 pilings were driven in the bottoms for footing. A concrete seal four-feet thick was poured and on top of this a two-foot concrete mat was placed. Pumping and building of the forms inside the cofferdams completed the piers to the point of pouring.

● Left, above: After the forms are oil-treated reinforcing steel is installed for the concrete beams. Left: One of the coffer dams is bailed out with a Jaeger pump.

Coordinating Concrete Work

Handling concrete over long distances and mixing concrete in large quantities presents as many problems as there are jobs. Every new contract seems to present a fresh set of difficulties, totally unlike any encountered before. The handling of men and materials on both land and water at the same time often taxes the ingenuity of both contractors and equipment. Here is where C. E. Hillyer, who has spent 45 years in construction, profited from past experiences and evolved some profitable and time-saving innovations.

For instance, in the matter of transporting sand and gravel from his base on the west shore to the concrete barge at whatever point it might be located, Mr. Hillyer decided to send the sand and gravel to it mixed in proper proportions. The mixer and the pouring tower and associated equipment are installed on the concrete barge.

Mr. Hillyer decided to send the sand and gravel to this float in containers ready for dumping into the mixer. For this purpose he especially built 50 steel cans, each of which were of 42 cubic feet capacity. His loading hopper was equipped with an automatic weighing device. When the cans were set under the spout, the operator loaded them with sand and gravel simultaneously in exactly the right weights.

The 1-yd. Bucyrus-Erie was used for loading the hopper compartments with sand and gravel, the gravel being actually Hudson trap rock. After the hopper was

loaded, the clamshell was used to swing these cans under the spout for filling, then loading them onto a barge. Fifty cans were loaded on a barge which was pushed or pulled by a motorboat to the concrete barge where they were unloaded.

Cement was also transported on the barge in sacks in the conventional manner. All materials came to the job by water. Sand and rock were shipped to Tampa by steamer and there unloaded on barges and pulled to the job at Treasure Island. Each barge held about 175 tons of material. The Bucyrus-Erie tackled the unloading of these large floats. The material was unloaded directly into the big hopper until it was full, then it was piled on the ground so as to release the float.

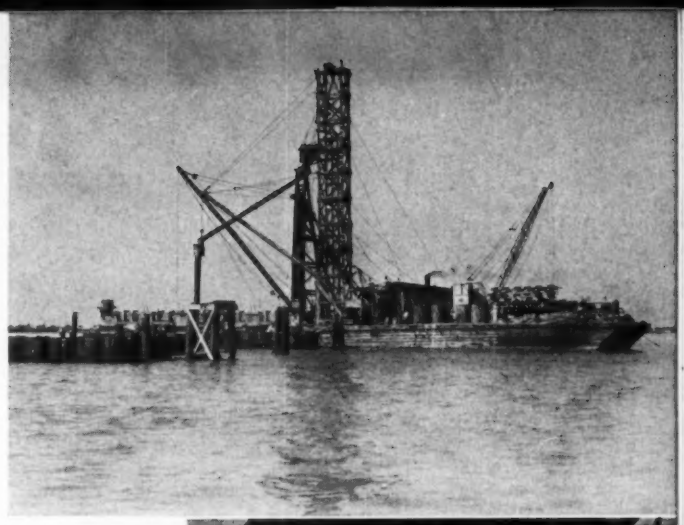
Unique Curved Form Supports

Another one of Mr. Hillyer's innovations is the unique system of supporting the curved forms under the concrete arches of each bridge span. Steel shelves, or projecting ledges, with holes for bolts, were left in each concrete pier just above the water line. A steel framework with upper line corresponding to the curve of the arch was made to fit the length and width of the span and was supported by these ledges into which the framework was bolted.

After the concrete was poured and set, these whalebacks were unbolted and they dropped down bringing most of the wooden forms with them. This proved to be a very economical and satisfactory system.

All forms were lined with plywood, which has an exceptionally smooth surface free from rough spots and knot holes. The result of this was that the concrete surface was much smoother when the forms were removed and did not require any rubbing after it set. There was another advantage in that the outside "skin" of concrete is supposed to be more waterproof than the inside, and this valuable "skin" was fully preserved by this method. In addition it presented a perfect appearance.

About 17,000 feet of lumber was required for each duck form. Much of this was used over and over again. Forms had to be provided for electric conduits for lighting purposes.



● **Right: Seagoing cement plant at work on a pier. A P&H dragline is at the right. Below: The automatic mixing hopper loads cans with proper aggregate ratio.**

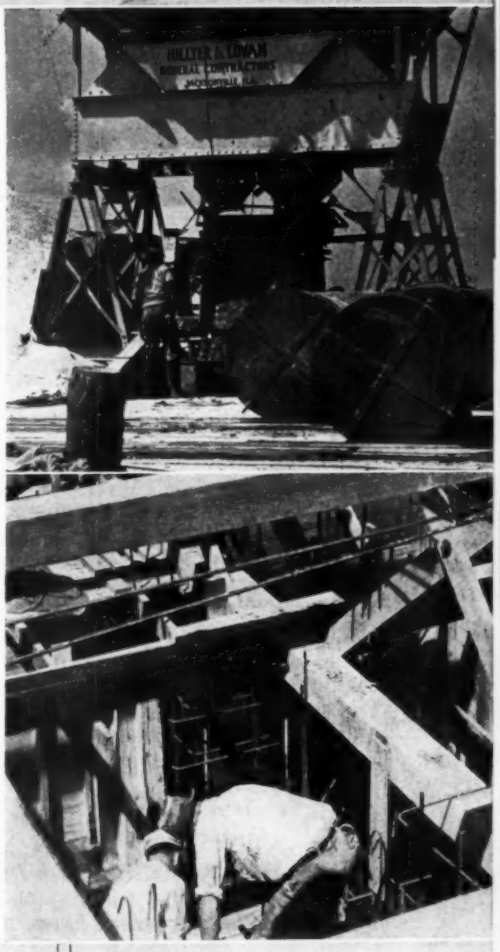
Fast Handling of Concrete

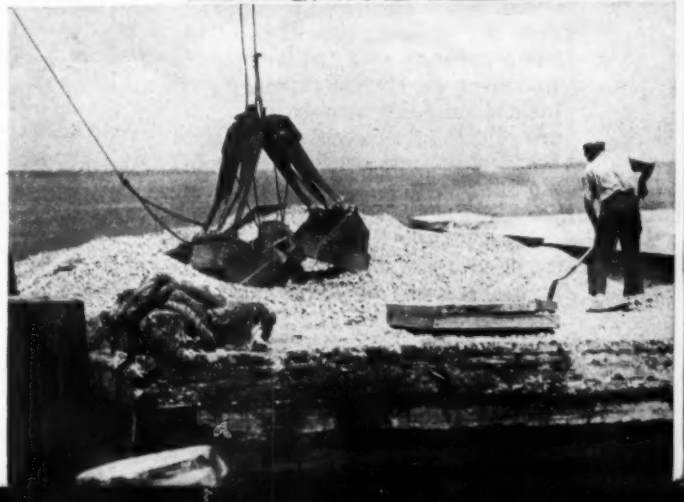
Concrete was handled in jig time on this job, where complete coordination of men, machinery and materials was the rule. The contractor poured 300 yards in nine hours. One of the top records was the pouring of a complete bridge deck in a little over seven hours. This deck contained about 126 yards, and the time included the finishing of the surface.

As to mixture, this was designed by the Pittsburgh Testing Laboratory to meet the Florida State Highway Specifications. Although the designed mix exceeded the requirement in actual field conditions, it was used throughout the job. Two cylinders were made from each pour. The seven day tests showed from 4,200 pounds to 5,200 pounds, and the 28 day tests often exceeded 7,000 pounds. This gave a material addition to the factor of safety and permitted of removing forms for reuse any time after seven days.

In many of the big jobs all over the country may be found the

(Continued on Page 130)

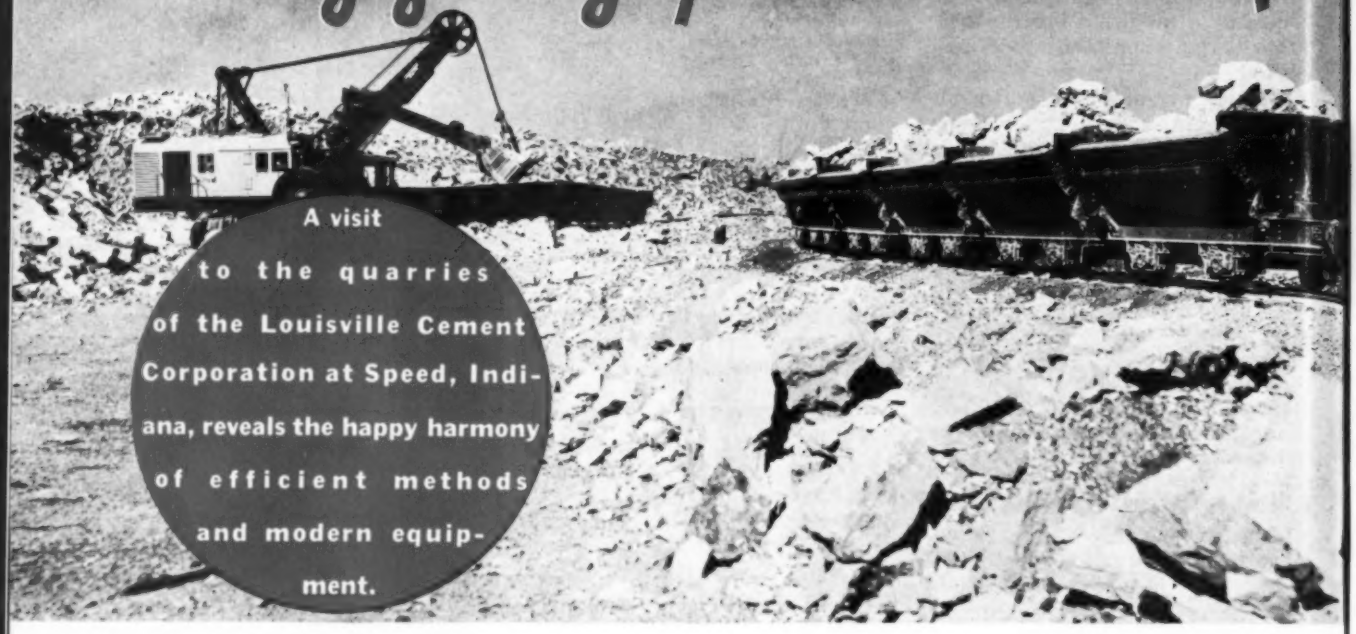




● **Right, above: Placing forms and steel reinforcing in one of the large coffer dams. Right: A clamshell grabs a yard of gravel from a barge for the mixing hopper.**

Digging for Cement

A visit to the quarries of the Louisville Cement Corporation at Speed, Indiana, reveals the happy harmony of efficient methods and modern equipment.



● A Bucyrus-Erie 4¾-yard electric shovel loads limestone rock to Easton quarry cars for transportation to the crushing mill.

CEMENT PRODUCERS since 1866" might well be the slogan of the Louisville Cement Corporation of Speed, Indiana. Forerunner of the present modern Portland and masonry-cement plants was the operations of John Hulme, who started producing natural cement in this area in 1830 for use in the construction of the Louisville and Portland Canal. After a succession of individual owners and partnerships, the operations were taken over in 1866 by the newly formed Louisville Cement Corporation.

Program of Constant Modernization

Since that date a program of constant modernization in plant operations and equipment have resulted in the steady growth of the firm. At present, the corporation has a capacity of 3,500 barrels of Brixment (a special masonry cement) and 5,000 barrels of standard Portland cement per day. High-early-strength cement and modified type B cement are also produced.

Both plants at Speed are being supplied from the same quarry area about one mile northeast of the plant. A 12-foot ledge of natural cement rock is the source of the Brixment, while under this layer a 40-foot ledge of rock provides material for the Portland cement. Digging operations on these two ledges are handled by separate crews of men and machinery.

To reach the Brixment deposit, a clay overburden varying in depth from 3 to 10 feet is removed by a ¾-yard Bucyrus-Erie Gas Air shovel loading into five 4-yard dump trucks. This material is hauled to one of two stripping dumps located on either side of the quarry area (see accompanying sketch).

Stripping operations are non-continuous and are performed when needed. The above equipment averages about 78 yards per hour in the clay overburden with a maximum yardage of 100 yards per hour.

Final clean up operations of the rock surface after the stripping shovel is handled by a Trackson High Shovel mounted on a Caterpillar D-4 tractor.

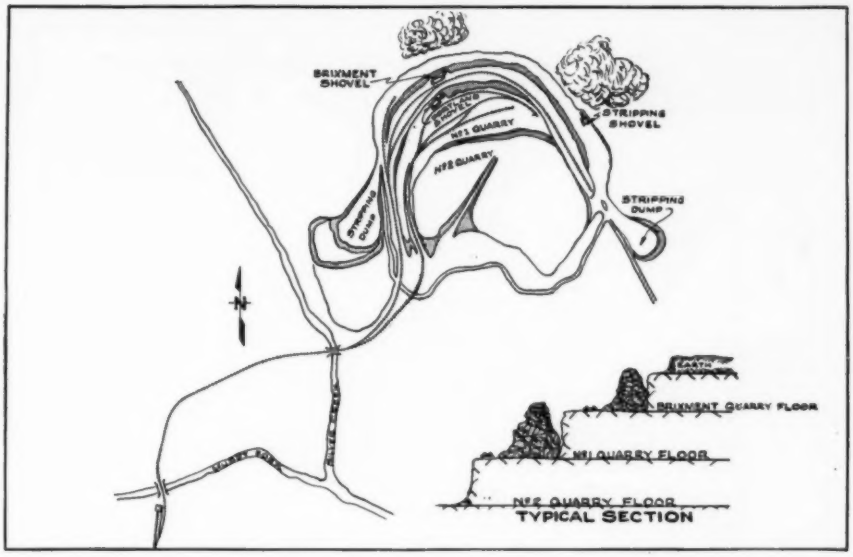
Working Natural Cement Rock Deposit

With the overburden out of the way, the top ledge of natural cement rock from which Brixment is made is ready for drilling operations. This deposit varies in depth from 14 to 17 feet and is drilled full-face with an Ingersoll-Rand X71 Leyner drifter on a wagon drill mounting. Holes of 2½ inches in diameter are spaced 7 feet apart in a parallel line 7 feet from the face. Each hole is loaded with approximately 20 pounds of 40% dynamite giving a rock-dynamite ratio of approximately 3.3 tons per pound of explosive.

Loading Blasted Rock

Blasted rock on this top deposit is loaded into 6-yard meter gauge railroad cars by a Marion steamer Model 60 swinging a 2½-yard dipper. Both the spotting of empties at the shovel and the hauling of loads to the plant is accomplished with one 18½-ton Porter locomotive.

Conversion of this natural cement rock into Brixment becomes a matter of cement milling after it has entered through a 36" x 48"



● Sketch of general quarry layout showing relative position of stripping, Brixment quarry, No. 1 Portland quarry, and No. 2 Portland quarry operations. Note the stripping dumps on the western and eastern sides of the quarry.

Traylor Jaw Crusher having a capacity of 100 tons per hour with reduction of plus 1½" to minus 6". The present input to this crusher is approximately 75 tons per hour.

Removal of the natural cement rock deposit clears the stage for the quarrying of the underlying limestone rock for Portland cement. Excavation of this 40-foot limestone deposit is handled in two 20-foot benches, the upper bench designated as Quarry No. 1 and the lower as Quarry No. 2.

Drilling Limestone Benches

Drilling in these two quarries is handled by two Ingersoll-Rand X71 Leyner Drifters mounted on pneumatic-tired carriages. The 20-foot holes are drilled 9 feet apart in a parallel line 6 feet from the face. Starting with a diameter of 2½" and ending at 2¼", the footage drilled per rig per hour averages about 30 feet with a maximum of 38 feet per hour.

Drill bits are changed twice daily and resharpened on a Jackbit Grinder. Three sharpenings is about the life of each bit.

Forty holes are shot per blast, with approximately 30 pounds of 60% strength dynamite per hole giving a rock-dynamite ratio of about 3 tons rock per pound of explosive. Some secondary blasting is required, with an Ingersoll-Rand J. A. 45 furnishing the necessary drilling.

Loading Out Blasted Material

Blasted limestone is loaded into the 35 ten-yard Easton quarry cars by a Bucyrus-Erie 120-B electric shovel equipped with Ward-Leonard control and a 4¾-yard dipper. The Easton Won-Way steel quarry cars are equipped with Timken roller bearings and operate on 1-meter gauge track.

Averaging about 12.5 tons per car, the 120-B loads approximately 220 tons of rock per shovel hour with a maximum of 280 tons per hour. The quarry cars are spotted at the shovel by a 25-ton Porter locomotive and the loaded cars are hauled to the crushing plant by a 34-ton Vulcan locomotive in trains of 8 cars each. The length of haul to the crusher is 3.8 miles.

Upon arrival at the crushing plant an Easton fully-automatic dumping mechanism with a Curtis airhoist is used to empty the stone from the cars into the primary 24 K Allis-Chalmers Gyratory crusher. The hoisting mechanism is floor-mounted and a special head on the hoist piston engages a dumping bracket on the bottom of one side of the cars and locks to it until the car body is returned to its original position. The operator's station is on the crusher side of the cars and a clever arrangement of mirrors makes it possible for him to see if the dumping mechanism is functioning properly.

Crushing Routine

The 48-inch gyratory crusher discharges its minus eight-inch product on an inclined bucket elevator which feeds a Pennsylvania SXT12 hammer-mill. After going through the hammer-mill the minus 1¾-inch secondary crusher product is elevated to a shuttle conveyor which distributes it to storage for later operations. The finished products, Portland cement and Brixment, finally reach their market on the Pennsylvania railroad and on the B & O railroad through the Indiana railroad.

William S. Speed, chairman of the board; H. D. Baylor, president; Eugene D. Hill, vice-president; and Henry S. Gray, secretary and treasurer are in executive control of the Louisville Cement Corporation.

● Northwest view of quarry operations. Shovel is working in No. 1 Portland Quarry, with No. 2 Quarry floor partially covered by water.

Turnpike Contract

(*Continued from Page 93*)

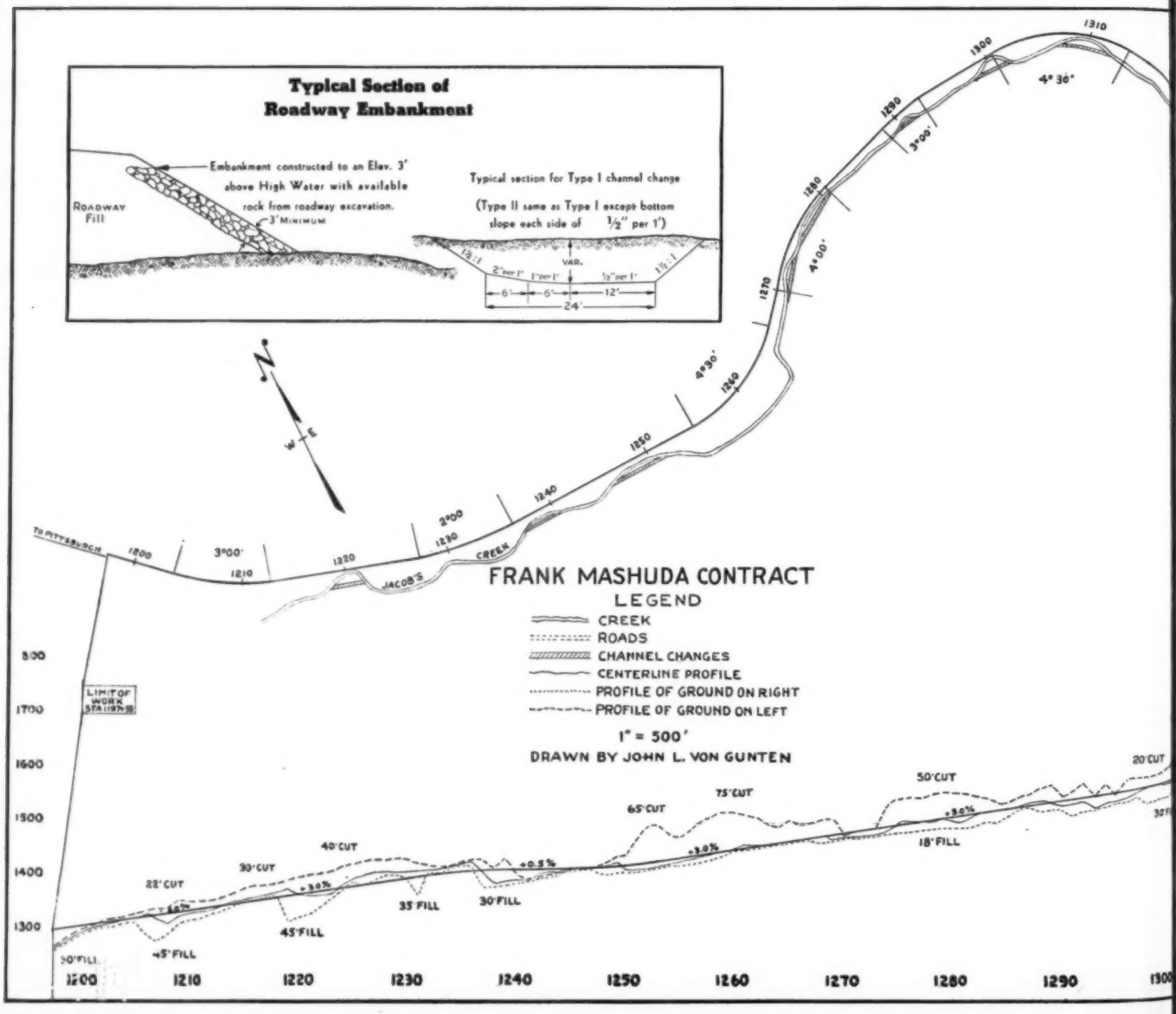
feet 4 inches. Skew 60° right. Length 117 feet 9½ inches. 557 cu. yds. Class A concrete. 295 cu. yds. Class B concrete. 60,530 lbs. plain steel bars. 20 cu. yds. stone backfill. 923 cu. yds. Class I excavation. 1,440 cu. yds. Class II excavation. 1,437 cu. yds. Class I channel excavation. Subcontractor Luteri used his one-yard Koehring crane in completing the excavation and placing the concrete for this arch. Both before and after the arch was built, the Koehring crane saw duty on the section, working on a rental basis for Frank Mashuda.

Unusual Grading Problems

A number of unusual grading problems were encountered on the Mashuda turnpike contract and as quickly disposed of as they were met. At Sta. 1349+65 an estimated 400 yards of excavation called for the removal of an iron furnace, said to be more than one hundred years old. The center-line of the turnpike ran straight through this old furnace. Its age placed its construction long before the inception of the plan to build the South Penn Railroad. A two-story frame building was also torn down at Sta. 1366+50. This was constructed, so the story goes, in 1883 to serve as a store for workers on the old South Penn Railroad grade. The presence of this building on the center-line of the turnpike proves that the present line was some feet away from the old line. No evidence of the old railroad grade was found on the Mashuda section, but it is known that the original line was not far from the present turnpike line. At Sta. 1351 another two story frame house dating back to the South Penn Railroad days was demolished.

Between stations 1304 and 1310 the turnpike line ran through an old limestone quarry requiring plenty of rock excavation some of it below grade to facilitate turnpike drainage. This material was tough going for the shovels and every yard had to be shot.

In the quantities given in the plan drawings furnished by the Turnpike Commission a goodly sprinkling of boulders were noted for removal. Between stations 1208 and 1220 there were 15 or 20 of these large boulders totaling 900 cubic yards of excavation. The largest were 40x30x6 and 49x20x8—sizeable chunks of rock even for a glacier to deposit, if such was



their origin. Certainly these large boulders encountered along the right-of-way from Sta. 1208 to 1350, a distance of about 2¾ miles, were not in any way related to the old limestone quarry previously mentioned. In all, about 7,000 yards of boulders were removed on the Mashuda contract.

Construction of Retaining Wall

At station 1221+50 Jacob's Creek makes a sharp turn towards the north — directly toward the turnpike grade. To prevent washout of the road bed a block channel retaining wall, including 125 yards Class II excavation, 45 yards Class B concrete and 126 yards cement rubble masonry was constructed. The lower end of the retaining wall was "tied to" a huge boulder effectively changing the stream's course into the new channel dug by the 48-B.

Going back to the eastern end of the contract, we find a fifteen foot fill completing the grade at Coffeen's rigid frame bridge over Jacob's Creek (Sta. 1359+72) and an eighteen foot fill to equal grade along the channel change from station 1369 to 1380. Dirt was hauled by the LeTourneau scrapers from twenty and eighteen foot cuts both west and east of this low ground.

The last big cut to the east is a fifty-five foot side hill cut. This dirt was hauled both west and east to low ground near Taylor's and Luteri's arches.

In spite of bad breaks in the weather during June when 21 rainy days played havoc with shovel and scraper output, work progressed nicely through the summer months. By the end of July the job was well over half way to completion.

A Bucyrus-Erie 10-B ⅜-cubic yard gasoline (Buda 3¼ x 4½ engine) was purchased late in July for digging drainage and secondary drainage ditches. The performance of this machine, which in comparison to the 48-B, 43-B or 37-B looks like a toy, was a big surprise. The little fellow was moved all over the job as needed, and proved to be an exceptional handy man. Most of the 16,000 lineal feet of 6- and 8-inch perforated vitrified clay tile underdrain, 1,300 feet of stone underdrain and laterals were excavated by the 10-B. About 3,700 yards of special and secondary ditches were also dug by this little shovel.

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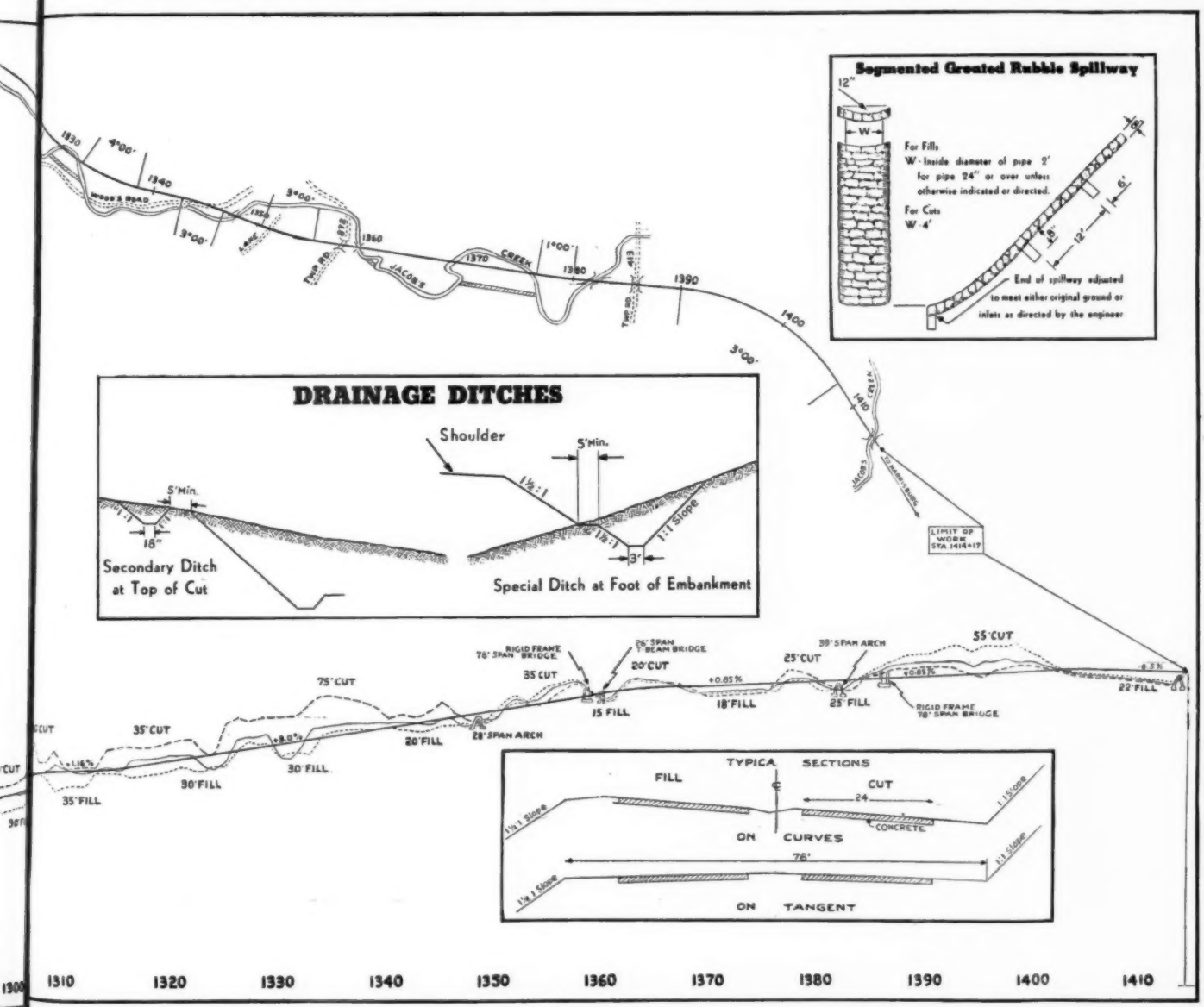

EXCAVATING ENGINEER

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The Excavating Engineer Publishing Co.
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Construction Outlook for 1940

The year 1939 closes with private building and engineering work going at a fairly satisfactory rate and public construction very markedly on the down-grade. General business and industrial activity, on the up-grade since June, 1939, were given an added stimulus by the outbreak of war in Europe and revision of American neutrality legislation.

The war's effect on private construction, so long as America remains neutral, is apt to be indirect; insofar as war purchases by belligerents offset decreases of our foreign trade brought about by neutrality regulations, and sustain a rising volume of industrial production, employment, and retail trade, and increase national income, they will act as a stimulus to all classes of private construction. The war's effect on public building and engineering work is more direct, shifting the emphasis of public expenditures away from purely civilian improvement projects to construction projects included in or directly related to the national defense program.

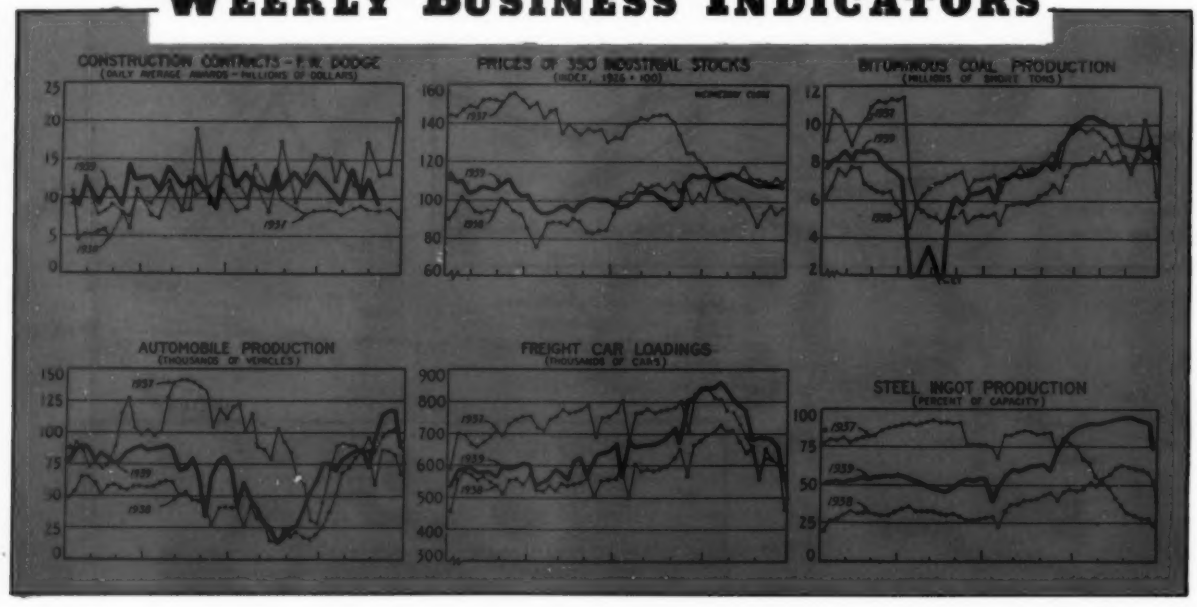
Construction undertaken by the War and Navy Departments will be divided territorially about as follows: 56 per cent of the total in the Canal Zone, Puerto Rico, Hawaii and other colonial possessions, 12 per cent in the Pacific Coast area, and only 32 per cent in the 37 Eastern States covered by the F. W. Dodge figures in the accompanying table. Army and Navy construction are thus likely to partially offset the probable declines in regular public works activities. A moderate-sized PWA program, consisting principally of strategic highways, airports, hospitals, and some power plants may be authorized by the next Congress.

Two Federal programs have large carry-over funds. One is the regular Federal aid highway program, the other the subsidized public housing program of the United States Housing Authority. These large funds tend to offset very considerably the anticipated declines in other classes of public construction activity.

The threat of rapidly rising construction costs is still a real one, and has been recognized as such practically throughout the industry, as well as in other fields of business and in Government. At the moment this is being written, self control by industry appears to be a sufficiently potent factor to avert the dangers of price inflation through most, if not all, of 1940. The estimates here presented assume that building cost increases will be moderate and will not be a vitally important factor in determining next year's total construction volume.

Consideration must be given to the fact that 1940 is a presidential election year with possible political controversies affecting business confidence. The possibility of a minor dip in industrial activity and of a continued slowing of construction through the first quarter of this year must also be taken into account. An effort has also been made to discount over-optimistic estimates of foreign purchases. It seems safe to assume that the United States will not be in the war in 1940 or even be moving definitely toward a war declaration; we are not, however, entirely justified in dismissing all consideration of the possiblity of peace in Europe. The 1940 construction estimates here presented may be quite easily exceeded by the year's actual volume, but errors on the conservative side seem preferable to over-optimistic expectations. A moderately slow start with rising rates of activity as the year progresses is the indicated trend. Commercial, manufacturing, and private residential building are apt to increase most markedly in particular industrial centers receiving large war orders.

Weekly Business Indicators



This factor, together with the relatively large Army and Navy construction planned for the area, indicates a relatively high acceleration of activity in the Pacific Coast States.

Explanation of the construction figures given in the accompanying table is as follows:

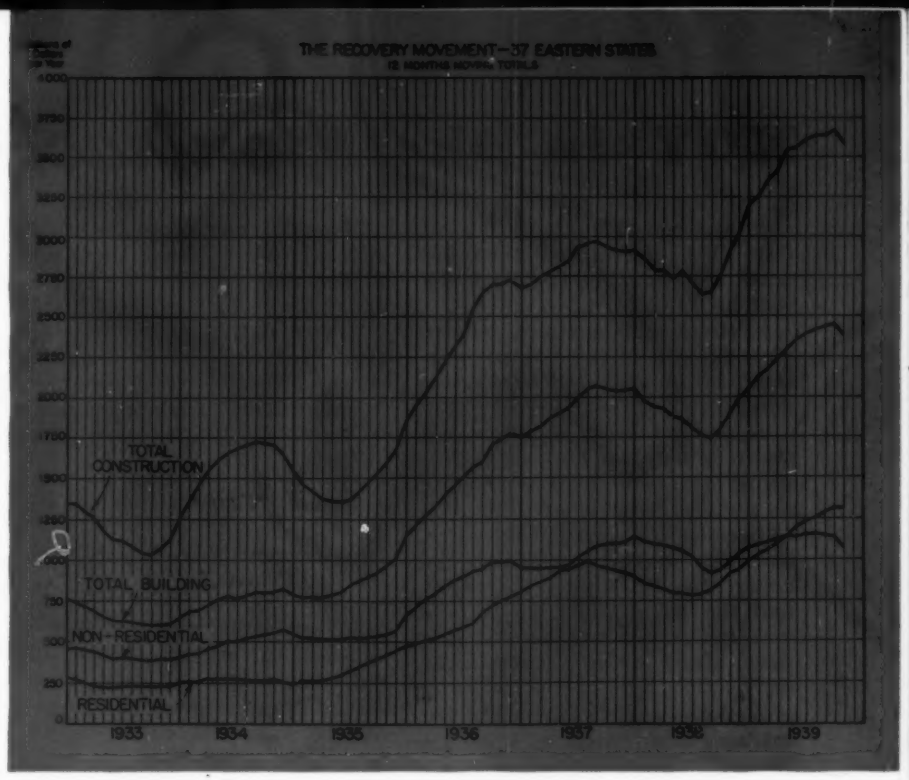
Commercial Buildings: Indications of generally greater industrial and business activity make increased commercial building practically inevitable; the 1940 estimate here set down is slightly under the 1937 actual figure (297 millions), the largest of recent years.

Manufacturing Buildings: The 1940 estimate figure is almost a gambler's guess, this being about the most difficult class of building to estimate accurately in advance. Industrial management is apt to be very cautious about over-expansion of plant facilities, a factor which will be offset partially by guarantees against losses due to plant extension which purchasing governments will make. Much increased productive capacity can be provided by installation of new equipment in existing buildings. The 1937 peak volume of $314,000,000 might be considered possible of attainment next year, but such a figure is difficult to justify in a set of conservative advance estimates.

Educational Buildings—Hospitals and Institutions—Public Buildings—Social and Recreational Buildings: Strictly civilian improvements are likely to decrease markedly with no stimulus of Federal financial aid; buildings included in or related rather directly to the defense program should tend to increase.

Religious Buildings: This class of building tends to increase in a marked degree after an extended period of rising prosperity; no particular indication of big increases in 1940.

Residential Buildings: A 5 per cent increase in private residential building volume, combined with a 65 per cent increase in public housing volume should create a net 14 per cent increase. The estimated increase in private work is based on anticipated industrial, business, employment, and income



● Issued by the F. W. Dodge Corporation, this chart portrays the rising construction trend since 1933.

increases. The U.S.H.A. program, under its original $800,000,000 loan authorization, will have 35 to 38 per cent of its total construction under contract by the end of 1939; a considerably increased volume is scheduled for next year, and the increase here estimated is possible of attainment with no new authorizations by the next Congress. There will also be some

(*Continued on Page 130*)

VALUE OF TOTAL CONSTRUCTION CONTRACTS (37 EASTERN STATES)

CLASSIFICATION	1938 ACTUAL Dollars	1939 ESTIMATE (Based on ten months data) Dollars	% Change From 1938	1940 ESTIMATE Dollars	% Change From 1939
Commercial Buildings	215,807,000	250,000,000	+16	290,000,000	+16
Manufacturing Buildings	121,084,000	170,000,000	+40	240,000,000	+41
Educational Buildings	334,066,000	200,000,000	—40	135,000,000	—32
Hospital & Institutional	115,598,000	84,000,000	—27	95,000,000	+13
Public Buildings	114,060,000	102,000,000	—11	75,000,000	—26
Religious Buildings	35,816,000	40,000,000	+12	40,000,000	0
Social & Recreational	107,983,000	84,000,000	—22	75,000,000	—11
Misc. Non-Residential	27,723,000	28,000,000	+ 1	35,000,000	+25
TOTAL NON-RESIDENTIAL	1,072,137,000	958,000,000	—11	985,000,000	+ 3
(Public)	572,318,000	401,000,000	—30	330,000,000	—18
(Private)	499,819,000	557,000,000	+11	655,000,000	+18
Apartments & Hotels	256,232,000	418,000,000	+63	525,000,000	+26
1 & 2 Family Houses	701,796,000	905,000,000	+29	983,000,000	+ 9
Other Shelter	27,759,000	17,000,000	—39	22,000,000	+29
TOTAL RESIDENTIAL	985,787,000	1,340,000,000	+36	1,530,000,000	+14
(Public)	86,226,000	205,000,000	+138	338,000,000	+65
(Private)	899,561,000	1,135,000,000	+26	1,192,000,000	+ 5
PUBLIC WORKS & UTILITIES	1,139,004,000	1,057,000,000	— 7	1,065,000,000	+ 1
(Public)	1,046,176,000	919,000,000	—12	872,000,000	— 5
(Private)	92,828,000	138,000,000	+49	193,000,000	+40
TOTAL CONSTRUCTION	3,196,928,000	3,355,000,000	+ 5	3,580,000,000	+ 7
(Public)	1,704,720,000	1,525,000,000	—11	1,540,000,000	+ 1
(Private)	1,492,208,000	1,830,000,000	+23	2,040,000,000	+11

NOT in the *Contract*

It was one of mother's busiest days. For the second time her small son came in from playing with his pants torn.

"You go right upstairs, remove your pants, and mend them yourself," his exasperated mother ordered.

Some time later she went upstairs to see how he was getting along. The torn pants were lying on a chair, but there was no sign of her son. Returning downstairs, she noticed that the door to the cellar, usually closed, was open, and she called down, loudly and sternly, "Are you running around down there without your pants on?"

A deep voice answered: "No, madam, I'm reading the gas meter."

Six-year-old Mary awoke about 2 in the morning.

"Tell me a story, Mummie," she pleaded.

"Hush, darling," said mother. "Daddy will be in soon and tell us both one."

"Pappy," complained the mountain gal, "one o' them there city slickers didn't do right by me yistiddy. Air ye a'gonna shoot him?"

"Shore, datter," replied the old man, "but don't be so tarnation hurrified about it. Fust give me a chance t'shoot th' one who didn't do right by ye the day afore yistiddy!"

Barber: "Haven't I shaved you before?"

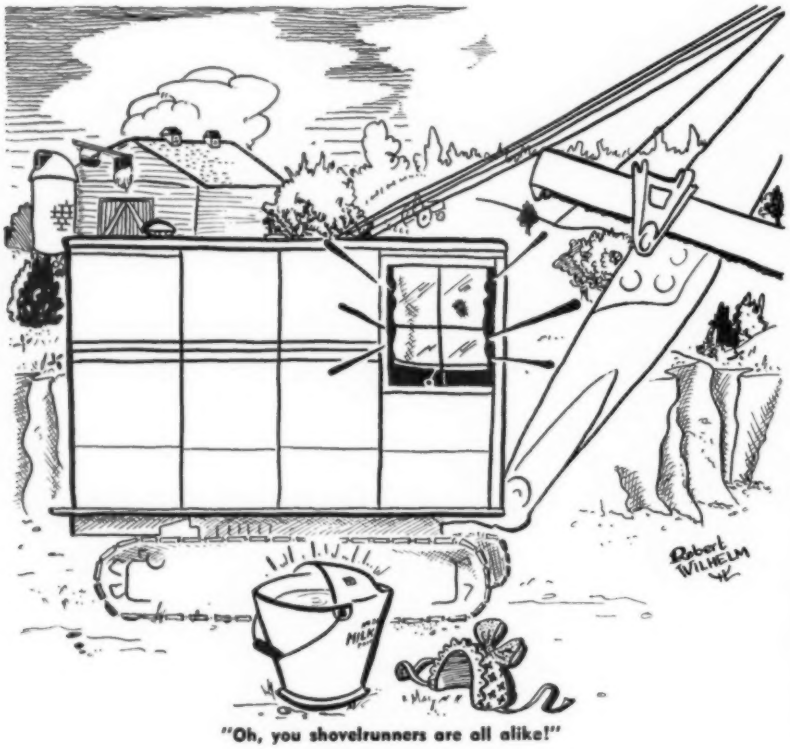
Customer: "No, I got those scars in France."

A sergeant was training a bunch of raw recruits on the rifle range. At a hundred yards every one of them missed the target. At fifty yards the result was the same. He moved them up to the twenty-five yard range, and still not a bullet hit the targets.

Enraged, the sergeant shouted: "Fix bayonets and charge!"

"She is a nicely reared girl, isn't she?"

"I should say so. Not bad from the front either."



"Oh, you shovelrunners are all alike!"

A refreshing new source of humor is provided in the reports of our Social Service investigators. Following are a few of these "gems" taken from actual reports.

Woman and house neat but bare.

Man has ulster on his stomach.

Man supported parents before marriage.

Woman has no job to be mentioned.

Woman is saving up for an illness.

Couple breaking up home, friends helping.

Milk needed for the baby and father is unable to supply it.

Until a year ago this applicant delivered ice and was a man of affairs.

Couple has been completely stripped. Now barely able to get along.

These people are extremely cultured. Something should be done about their condition.

Since Christmas family has been living on a Democratic basket.

Man has diabetes and is insulated twice a day.

Couple's only source of income is four boarders out of work. They owe $600.

Man aggressive—has nine children.

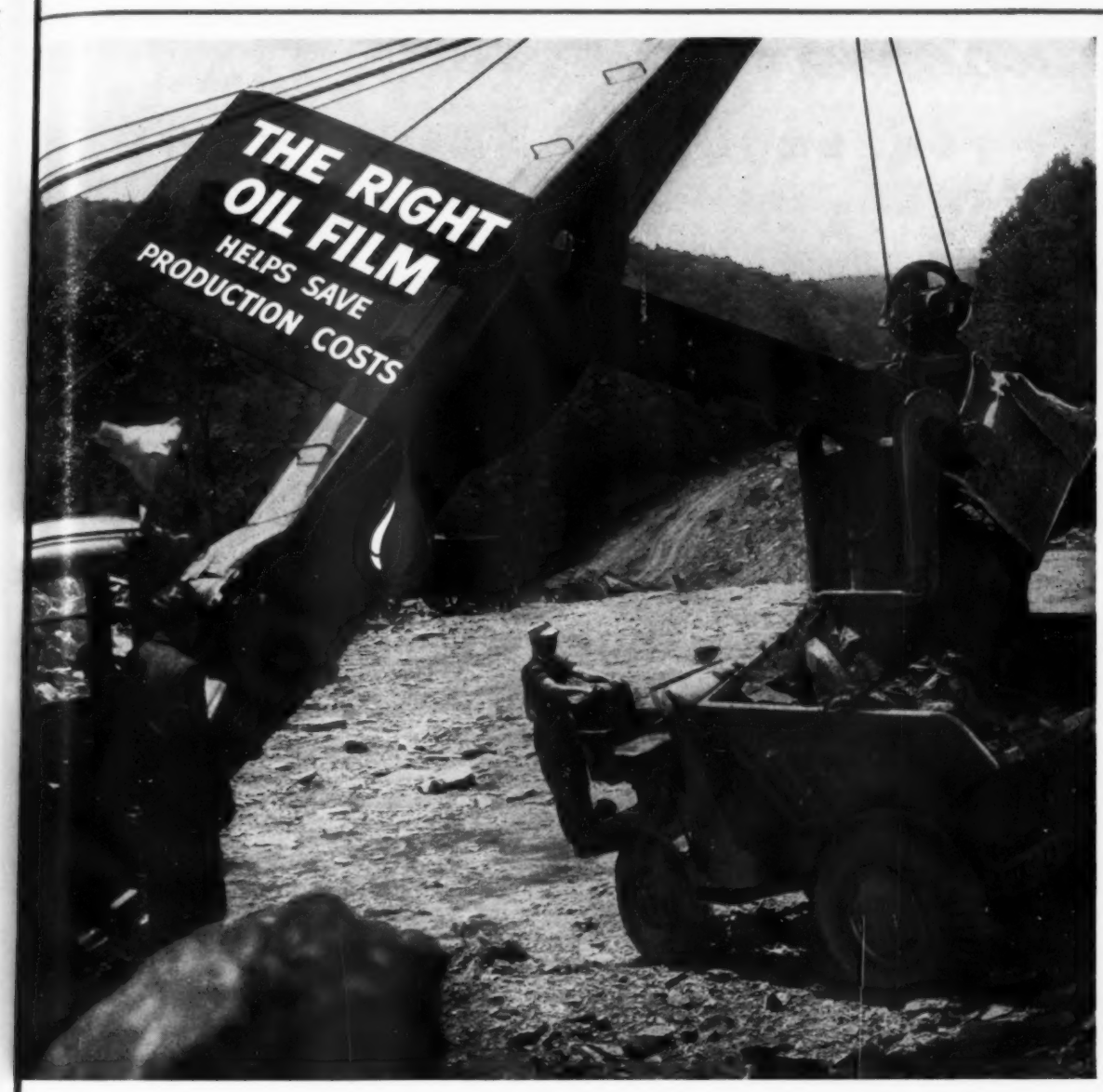
Applicants' wife is making little garments through the kindness of a neighbor.

Guide: "Now we shall see the sarcophagus of King Tut."

Bashful Old Maid: "I think I'd rather wait here."

Customer (to head waiter)—"Just as a matter of curiosity, did the waiter who took my order leave a family?"

Rich old Farmer Brown sadly gazed around the Sunday dinner table at his six sons and their respective wives. Finally he said, "I don't see any grandchildren around this table. I'll give ten thousand dollars to the first one of you who presents me with a grandchild. We will now say Grace." And when he raised his head again, he and grandma were the only ones at the table.



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Equipment you ought to KNOW ABOUT

Bucyrus-Erie H-28 Scraper

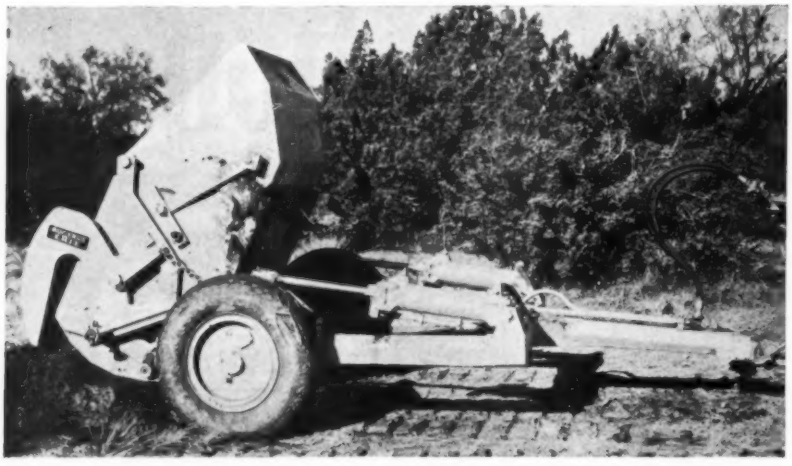
The new Bucyrus-Erie H-28 is a 2-wheel hydraulic scraper built for use with tractors rated at 25 to 35 horsepower. It has a struck capacity of 2½ cubic yards but will, according to the manufacturer, heap to loads of 3 or 4 cubic yards. Since the H-28 with its tractor can be loaded on a regular truck and hauled within usual dimension and load limits, no special permit is needed to haul it over the highways; thus it becomes especially handy for work involving fast moves from job to job. Or it can be used with a rubber-tired tractor to make a complete dirt-moving and traveling layout, a high speed all-on-rubber hookup that will not damage hard-surfaced roads.

Similar in design and construction to the larger Bucyrus-Erie 2-wheel scrapers, the H-28 operates on a safe low-pressure hydraulic system. It has the patented Bucyrus-Erie "double curve" cutting edge and dumps backwards and behind its wheels like a dump truck. Manufacturer claims the "double curve" cutting edge makes loading easy and quick by "boiling" dirt up into both apron and bowl of the scraper freely, easily, without dead action. Due to the boiling action, dirt does not tend to stick to sides or bottom of scraper and hence falls out easily when the load is dumped.

The back-dumping feature makes it possible for the H-28 to dump its loads over the edge of a bank or a fill; or over the edge of a ramp into trucks or cars. This feature also makes it possible to end-dump against foundations walls, bridge abutments, or around culverts. When dumping on the level, loads can be spilled in a heap, the adjustable tailgate floating over the dumped load without dragging material away from the dump. If desired, loads can also be dumped in windrows and spread.

Like all Bucyrus-Erie scrapers, the H-28 can be hauled by a tractor equipped with a Bucyrus-Erie bullgrader or bulldozer to make a combination unit. With the 2-wheel scrapers, hydraulic pressure for both units is furnished by a single pump on the tractor, with each unit controlled by a separate valve conveniently located beside the operator.

For full information, write to this magazine or to Bucyrus-Erie Company, South Milwaukee, Wisconsin.



Tractor-Trailer

A sturdy tractor economically powered and a rugged trailer that will stand the gaff is a combination now being offered for level quarry operations by Mack Trucks, Inc., Long Island City, New York.

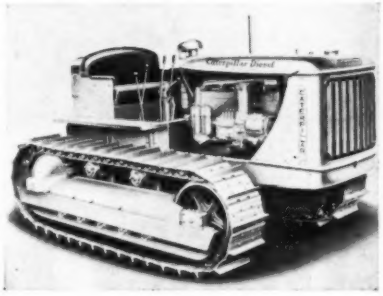
Quarries having level floors are good operations for these new semi-trailer combinations powered with the model EG Mack tractor, a unit of 132½" wheelbase having a 3¾x4⅜" engine. This tractor

has a smaller engine than would be used for a similar gross on a road unit since high power and speed are not needed for the average quarry. However, it has been built to withstand the rough going and hard knocks of quarry operation by the use of oversize axles, springs, and tires.

The trailer unit of this combination is manufactured by the Easton Car and Construction Company of Easton, Pennsylvania. Body is Phoenix type, side dump, of 9½ cubic yard capacity.

New "Caterpillar" Tractor

Caterpillar Tractor Company, Peoria, Illinois, has announced a new 75-drawbar horsepower Die-



sel D7 Tractor, engineered specifically, according to the manufacturer, to increase production and lower operating costs.

To reduce operator fatigue, the new D7 tractor has "finger tip" steering; the steering clutches are operated hydraulically by a separate control unit driven from the upper transmission shaft.

To further add to the operator's comfort, a wide and restful seat has been provided. Small seats on both the left and right hand arms

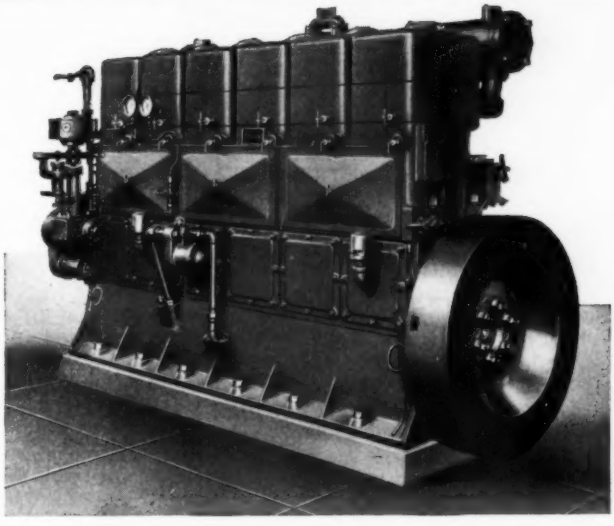
Atlas Powers Johnson dredge of Quartz Creek Dredging Company

The dredge of the Quartz Creek Dredging Company of Pierce, Idaho is another of the Atlas Diesel powered Johnson Dredges which has given a very good account of herself. The dredging company, headed by Charles L. Ross, has approximately five million yards in 3¾ miles of ground running up Quartz Creek with another 1½ miles on a tributary.

This operation was begun July 8, 1939, and the dredge has consistently averaged 3,000 yards a day with 2.8 cu. ft. buckets which the owners regard as exceptional performance. The dredge digs down to 17 feet below water level. A Northwest dragline strips ahead of the dredge, adding 500 yards to the daily production of the dredge.

The main power of the dredge is a 6 cylinder, 9" x 10½", enclosed type Atlas Diesel which develops 200 H.P. at 514 rpm. It drives a 125 K.W. General Electric generator which furnishes power for all of the individual motor drives and an electric welder.

The Atlas Diesel which powers this dredge is one of fourteen which Walter W. Johnson has bought in the past three years. They must be good, or a famous dredge builder would not buy them so consistently.



Atlas Diesels of the fully enclosed type illustrated above, are available in 4, 5, 6 and 8 cylinder models.

ATLAS IMPERIAL DIESEL ENGINE CO.

Eastern Division 115 Broad Street New York, N. Y. — **Central Division** 228 N. LaSalle St. Chicago, Illinois — **Southwestern Division** 5726 Navigation Blvd. Houston, Texas — **Western Division** 1000 Nineteenth Ave. Oakland, California

Gloucester - Baltimore - Providence - Philadelphia - Charleston - Miami - Jacksonville - Tarpon Springs - New Orleans Fort Worth - El Paso - Terminal Island - Seattle - Portland - Vancouver - Ketchikan - Honolulu - Manila.

ATLAS Imperial DIESEL ENGINES

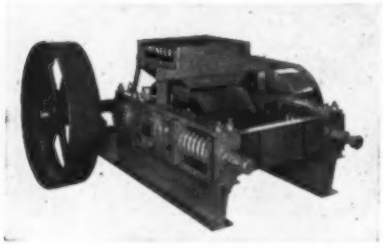
For your convenience in writing to Atlas Imperial Diesel Engine Co., you will find a card bound in this issue.

of the main seat provide a comfortable place from which the driver can operate rear-power-controlled equipment.

The new D7 Tractor is powered by a heavy-duty, four-cylinder, valve-in-head, "Caterpillar" Diesel Engine. It has a bore and stroke of 5¾"x8", and a full load governed r.p.m. of 1000. Belt horsepower is 87; drawbar, 75.

16" Roll Crusher

The Pioneer Engineering works of Minneapolis, Minnesota, have recently added a new roll crusher to their line. The new crusher has rolls 16" in diameter, with a 16" face and is offered with either bronze bearings or Timken bearings. One of the important and new features of the bronze bearing crusher is that the bearings



are enclosed and protected from dust, just like the anti-friction bearings.

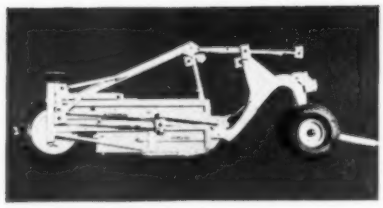
The gear-driven crusher is equipped with fine corrugated rolls which will produce small materials, but still have a large "bite." The shells are manganese steel, and replaceable.

LeTourneau SU Scraper

R. G. LeTourneau, Inc., has placed on the market a new, double bucket, cable controlled Carryall scraper. The SU scraper, rated at 14 cubic yards struck capacity and 18 heaped, is designed to give maximum capacity for loading under normal conditions without the aid of a pusher and thus to completely utilize tractor power.

To minimize loading effort and make the greater yardage possible the scraper blade is narrowed to 8'6", and a patented double bucket bowl used. The narrow cutting edge and two telescoping buckets give the effect of loading successively two small scrapers with a large tractor, and, according to the manufacturer, should result in capacity loads and extra yardages. After loading the first bucket to capacity, it is drawn back while the second is loaded.

A positive mechanical ejector tailgate is said to completely re-



move contents from bowl bottom and sides even when operating in wet and sticky material under adverse working conditions. This same positive load ejector controls the measured spreading of material from one inch to 16 inches. All dirt is pushed out the apron opening in front to eliminate void in fills.

Design features job proven on older Carryall models are incorporated in the SU with improvements.

Hough Tractor Sweeper

The Frank G. Hough Company, Libertyville, Illinois, announce the addition to their line of Sweepers and Sweeper Blowers the Hough Tractor Sweeper for use with Allis-Chalmers Model IB Tractors.

This unit, because it features a shorter sweeping path and lighter weight, is ideal for skating pond and sidewalk snow sweeping and cleaning walks, ramps, platforms, etc., in parks, industrial plants and material yards.

Ransome 34-E Paver

One of the latest models of 34E "Dual Drum" Pavers has just been shipped from the plant of the Ransome Concrete Machinery Company, Dunellen, New Jersey.

An interesting and novel feature is the use of the latest type of Diesel Engine as its power unit. It is said that by the use of this motor, savings in fuel alone approximately equal the wages paid to the average operator.

Ransome designed this model to have the very minimum height thereby meeting the average road conditions in this respect. The newest thing in the form of a two piece discharge chute has been provided. The boom swing, water valves, transfer chute, and discharge chute are hydraulically controlled with automatic features.

18-Yard Euclid Scraper

The new Model LDT-63W Euclid scraper was launched at the Chicago Road Show. It is said this powerful 200 horsepower unit

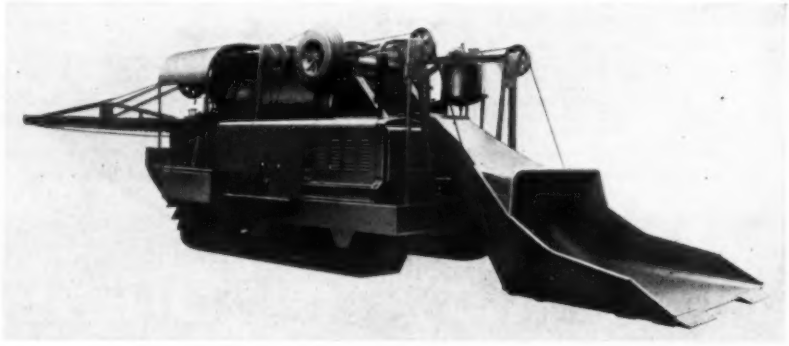
equipped with 24.00x32 tires, has a struck measure capacity of 18 cubic yards or a heap load capacity of 20.75 cubic yards on a 3:1 slope. Its top speed is about 25 m.p.h.

Although of conventional Euclid bottom dump design and construction, the Model LDT-63W Euclid has two important improvements. The rear axle is the largest of its type ever made. It is of the full-floating Euclid planetary type with a total reduction of 25.68 to 1.

New Hydraulic Hoist

The Anthony Company of Streator, Illinois, is announcing a new Hydraulic Hoist, which will be an addition to the complete line of Hydraulic Hoists they are now manufacturing. This new Double Arm type lift is a fast, powerful, low pressure hoist with the lift point well forward and centralized under the load. During the entire dumping operation the arms lift vertically to the bottom of the body, it is claimed.

"Low Loading Height," which



New DIESEL TRACTRACTORS by INTERNATIONAL HARVESTER

A YEAR AGO we announced the big, powerful TD-18 TracTracTor, a new top for Diesel crawlers. Today International Harvester presents a rugged quartet of streamlined crawlers —TD-18, TD-14, TD-9 and TD-6. FOUR *Diesel TracTracTors for 1940*—big news from the world's leading tractor builder to *all* operators of crawler tractors!

Here's the complete line-up for you to look over—the big fellow at the right, already a popular favorite in the heavy-crawler field; his little brother at the far left; and the step-ups in between. There's not an ounce of lazy horsepower in any of them! They're ready to tackle their weight in wildcats—each one is ready to lick the crawler-power problems in his range!

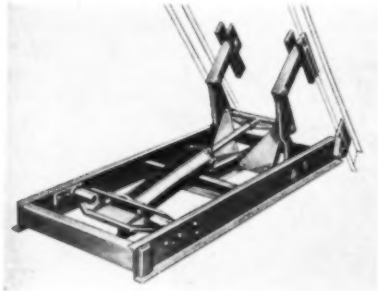
In this complete series of TracTracTors, INTERNATIONAL offers you a new standard of Diesel performance and economy—perfectly designed balanced power in capacities to meet every demand of crawler-tractor users. Standardize on International and enjoy all the advantages only Harvester can provide. Get the full story from any International industrial power dealer or Company branch, or write us.

A great variety of specially designed allied equipment available for all TracTracTor sizes.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

Now 4 Sizes

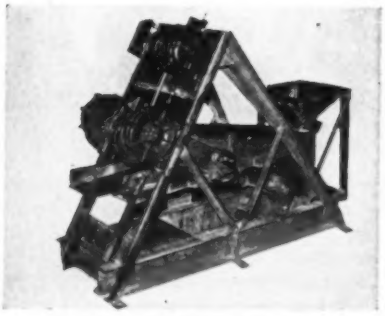
has been one of the outstanding features of the Anthony line, is also a feature of this new model hoist. The bottom of the box is



only 11" from the truck chassis frame, which is the minimum distance necessary for tire clearance. Another feature, also being announced, which is to be found in all Anthony Hydraulic Hoists for 1940, will be a "Balanced" valve, which enables the hoist to be operated by button control on the dash.

More About Desert Sluice

The new Desert Sluice on which Excavating Engineer carried a preliminary announcement in the November issue, makes use of a new principle in the winning of gold, platinum, tin, etc., from alluvial gravels. You will remem-



ber that this is the sluice that requires no water for transportation of materials; classification is according to the specific gravity of the particle; both coarse and fine gold are saved in the same riffle; the riffles are always open and there is no packing by black sand or fine sediment.

The machine is simple and easy to operate, and because of its portability can be moved readily from one site to another. Tailings are discharged in a damp condition but contain practically no free water so that placer mining with the Desert Sluice can be carried on without pollution of streams.

Two standard units are now available and for the purpose of preliminary estimates, the following data regarding these units may be used:

12-Inch Unit

Overall dimensions of pan—12 inches x 77 inches.
Classifying zone—12 inches x 56 inches.
Weight without feeder, engine and water tank—1900 pounds.
Weight of feeder—870 pounds.

24-Inch Unit

Overall dimensions of pan—24 inches x 100 inches.
Classifying zone—24 inches x 66 inches.
Weight without feeder, engine and water tank—3850 pounds.
Weight of feeder—975 pounds.

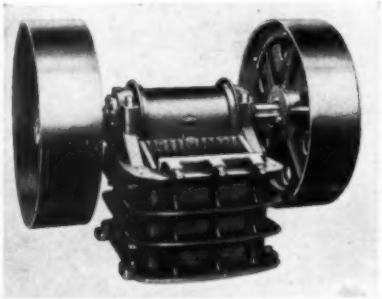
The capacity depends upon proportion of fine material. Reports of test show that a 12-inch unit, when equipped with a 3/8 mesh screen and operating on gravels where but one-third will pass the screen, can efficiently operate at the rate of 4 cubic yards per hour as delivered, and when so operating the plus 3/8 material will be thoroughly washed. Except for elimination of boulders, no preliminary screening is required. A 42-inch unit, handling material as above mentioned, is claimed to have a capacity of approximately 15 cubic yards per hour as delivered.

Units can be arranged for group operation. A mobile plant to handle 100 cubic yards (bank measurement) per hour is now being designed.

The water requirements will depend somewhat upon the character of the materials. Roughly, one gallon per minute per cubic yard per hour, as delivered, can be used for preliminary estimating purposes. If the ground is wet, less will be required.

New Jaw Crusher

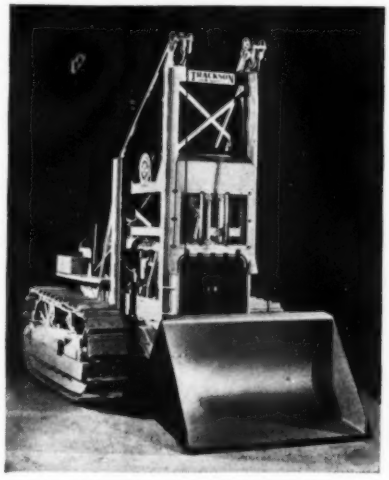
A new 10x24 jaw crusher has been developed by the Diamond Iron Works, Inc., Minneapolis, Minnesota. In this unit the features claimed are greater capacity at lower power costs with more uniform product size control. This unit is built with oversize heavy



duty roller bearings in pitman and journal boxes with extra heavy forged alloy steel heat treated eccentric shaft.

New Trackson Model

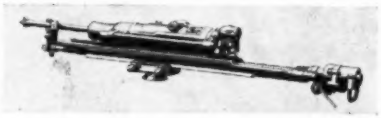
A brand new Trackson Shovel for the D-2 Diesel-powered "Caterpillar" was displayed for the first time at the Chicago Road Show. This new machine was de-



signed to be a smaller, more compact shovel, capable of handling a wide variety of jobs, such as shoulder trimming and ditch cleaning; general excavating work; handling sand, gravel or other road materials, etc. Low first cost, inexpensive maintenance and economical fuel consumption are features claimed for this new machine.

Drifter Rock Drill

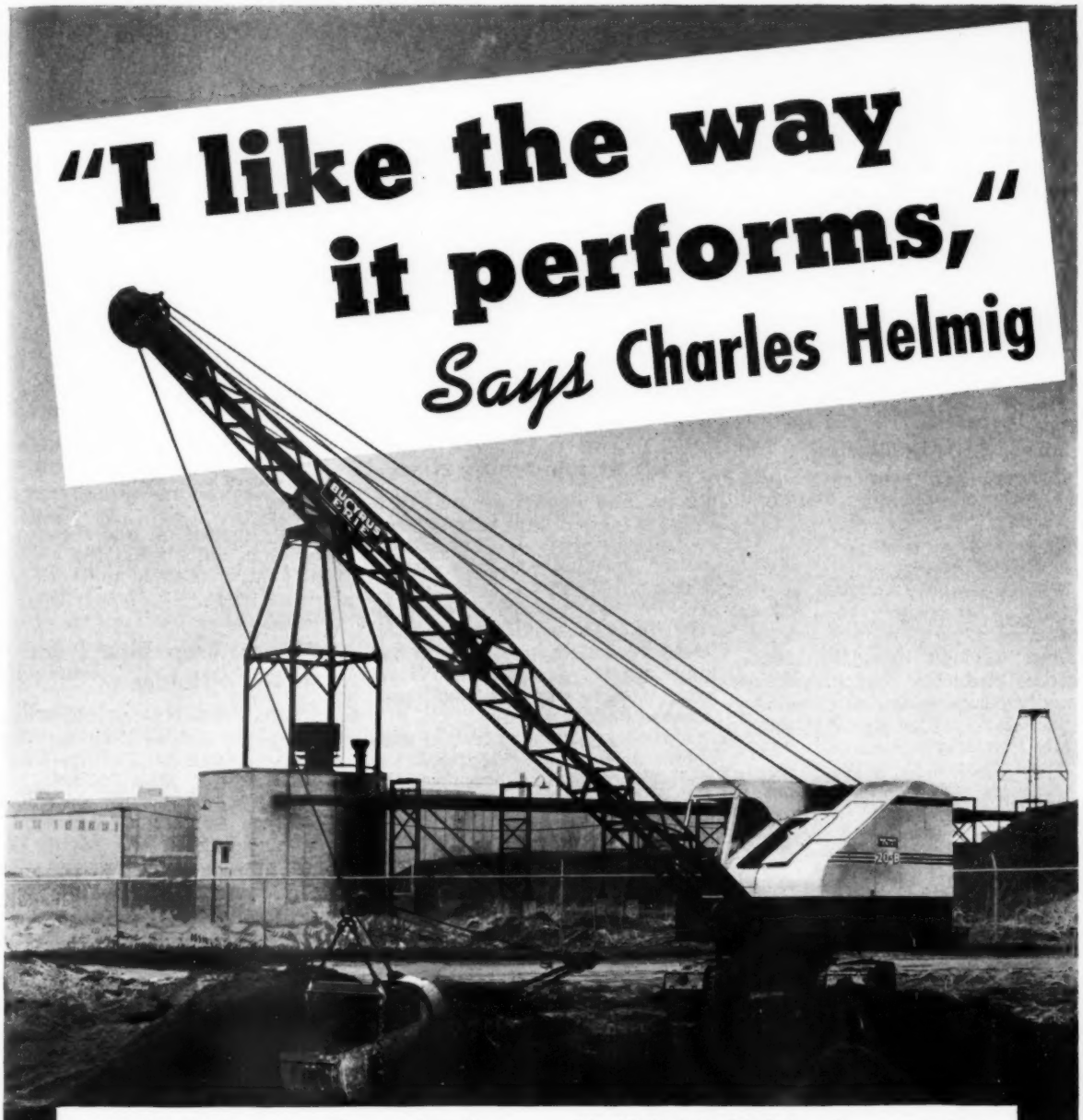
A new Drifter Rock Drill, known as the 100B, has recently been added to the Thor line of Mining and Contractors' Tools by



the Independent Pneumatic Tool Company, 600 West Jackson Blvd., Chicago, Illinois. The 100B is designed for heavy-duty drifting in mining and large tunnel work.

Used with 1¼" and 1½" round lugged steels, its power and strong rotation give it remarkable drilling speed in the hardest formations, it is claimed. In addition, a constant blowing action keeps the hole clean and for final hole cleaning a manually operated valve is easily accessible for extra blowing power.

"I like the way it performs," Says Charles Helmig



With his 20-B equipped as a dragline, Mr. Helmig gets an average output of 100 bank yards an hour in gravel and dirt, and 75 yards an hour in tough clay. His best record has been 1,000 bank yards of dirt in 8 hours. Working a wide territory around Pekin, Illinois, Mr. Helmig's 20-B has been used on road grading, trenching, stripping, basement excavation, digging and cleaning ditches, park and airport grading. You, too, will find 20-B speed and mobility a big factor in getting jobs. Write for full details.

BT-29

Bucyrus-Erie

BUCYRUS ERIE

SOUTH MILWAUKEE WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Field NOTES

What to Do for a Wound

Any break in the skin is a wound. Most wounds heal quickly if they are cared for properly. But wounds can become extremely serious if infection develops or if the injured persons lose too much blood.

The best thing, of course, is to have every wound cared for by a doctor, but if a doctor is not immediately available, some qualified person should render first aid at once.

First—Stop the bleeding;

Second—Apply an antiseptic such as iodine or mercurochrome;

Third—Apply a sterile bandage or pad.

Most infections result from the neglect of simple injuries such as cuts or scratches on the fingers or hands. Serious injuries seldom become infected because they usually get immediate attention.

Here are a few first-aid principles that everyone should know:

If iodine is used apply a 3 per cent solution sparingly: let it dry before bandaging; usually only one application a day is necessary.

If mercurochrome is used, apply a 2 per cent or 5 per cent solution.

Dressing should be changed when soiled, loose, wet or uncomfortable.

If swelling or pain develops, see your doctor at once.

In some cases wounds must be cleaned or splinters removed; but such treatment should be left to a doctor or nurse.

Keep dirt, fingers and other unsterile substances away from wounds.

Do not put adhesive tape on a wound; to do so may cause festering. Use adhesive only to keep bandages in place.

Remember—get immediate first aid for all wounds, no matter how slight they may seem to be.

—National Safety Council.

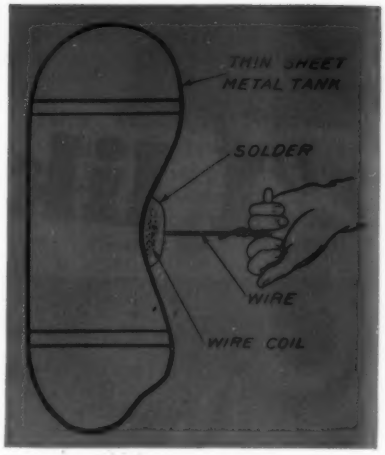
Tank Straightening Hint

The accompanying sketch shows a method that may be used successfully in straightening thin, dented or collapsed tanks. Use of a straightening rod on the inside or applying internal water or other pressure for forcing out the dents, if not impossible, may require a great deal of time. However, there is another much simpler method.

Make a coil on the end of a wire similar to that shown in the sketch and solder it onto the tank at the dented place. When solidly attached, pull with one hand and pound around the outside of the dent with a hammer with the other hand simultaneously. The dent will usually come out without any difficulty.

After straightening, the solder is easily melted off and the same process is quickly shifted to the next dent, if there is another.

—W. F. Schaphorst, M.E.



● A handy way of straightening out a collapsed tank is clearly explained in this sketch.

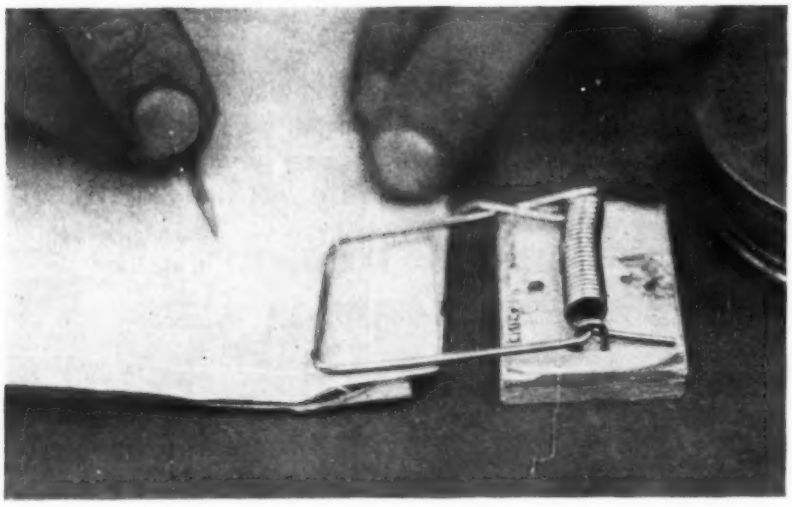
Mouse Trap Blue Print Holder

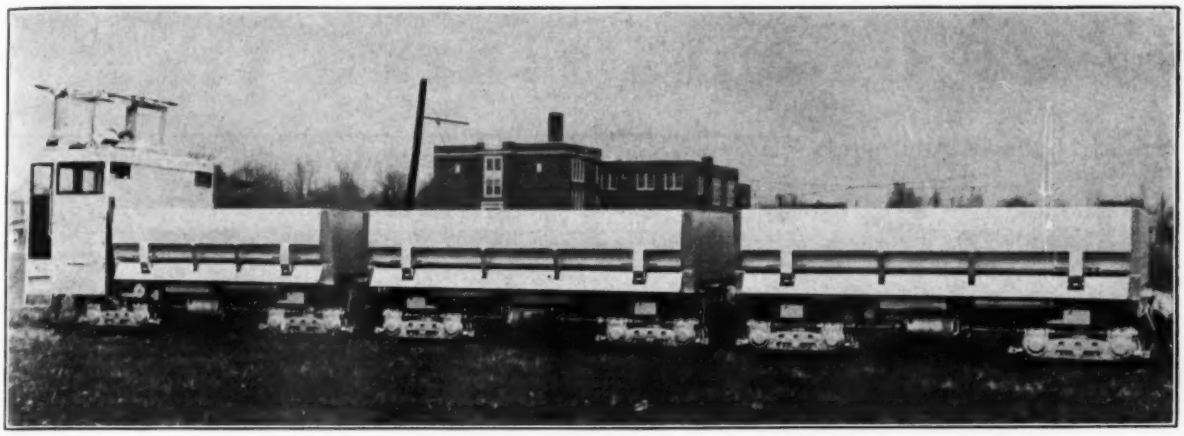
Large, long blue prints when unrolled are generally not an easy thing to handle around the usual roughly made construction job desk or worktable. They are rolled of course to facilitate carrying from one part of the job to another when necessary and to prevent damage which folding would do to them. Back rolling is often hard on paper none too tough and durable to start with.

To make a convenient holder cut away the front and back parts of one or two common inexpensive mouse traps and tack them down at the end of the desk or print table as illustrated. Two small brads or cigar box nails will hold them down nicely. Ends and corners of the left or right hand end of long prints can be caught under them and held down neatly and securely as shown. They are not in the way towards the upper part or left end of the desk or table and eliminate the usual use of loose weights which are generally anything from brick to pieces of scrap iron picked up on the need of the moment and used when nothing else is handy. The spring end will not deface or scratch the print corners which often happens when a piece of iron starts rolling or slipping around.

—Frank Bentley.

● This convenient holder for corners or ends of large, unrolled blue prints is a tacked down section of a common mouse trap.

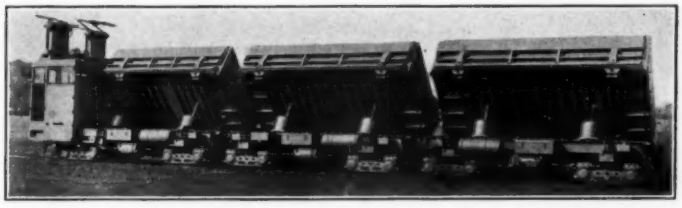




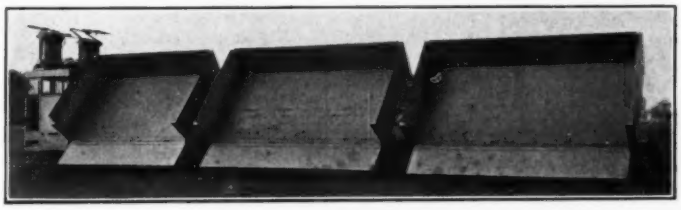
USE DIFFERENTIAL ELECTRIC TRAINS FOR LOWEST HAULAGE COSTS

Differential trains speed up shovel operation because the bodies are 10′ 3″ wide inside. Traction on all wheels provides for quick spotting and fast acceleration from position at shovel. The live load capacity is twice the dead weight of the train because the power plant is not hauled with the load.

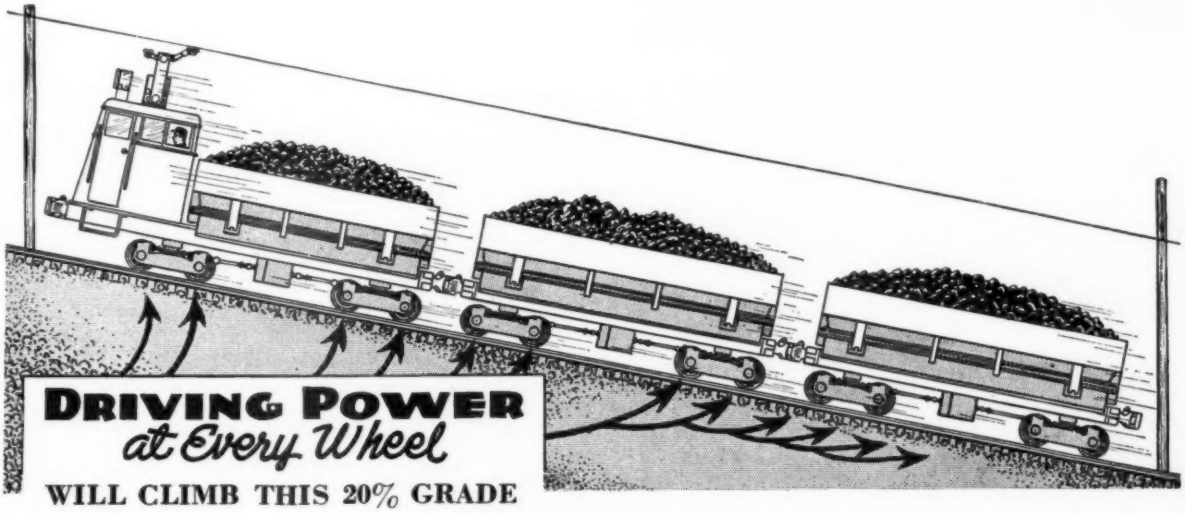
Light weight, high-speed electric motors provide traction on all wheels of the train. These characteristics added to those of the Differential AXLESS POWER TRUCKS provide safe, high-speed transportation. All types of material are moved directly from the shovel to destination over sharp curves and up 10% grades. In fact, these trains have sufficient adhesion to climb a 20% grade.



Any size or class of material dumped quickly to either side.



Simple and rugged construction assure long life and low maintenance.



DIFFERENTIAL STEEL CAR CO., FINDLAY, OHIO

For your convenience in writing to Differential Steel Car Co., you will find a card bound in this issue.

Shots from the FIRING LINE

Federal Highway Allotments

Highway funds of $156,000,000 have been apportioned among the 48 states, the District of Columbia, Hawaii and Puerto Rico for highway improvement and elimination of hazards at railroad grade crossings, available from appropriations authorized for the fiscal year beginning July 1, 1940, after deductions of amounts authorized for administrative expenses.

The apportionment was authorized by the Congressional Act of July 8, 1938, which provided $115,000,000 for improvement of the federal aid system and its extensions through cities, $15,000,000 for improvement of secondary or feeder roads, and $30,000,000 for elimination of hazards at railroad grade crossings.

The highway funds were apportioned among the states in proportion to population, area, and mileage of rural post roads. Grade crossing funds were apportioned, one-half on the basis of population, one-fourth on the basis of mileage of the federal aid system, and one-fourth according to railroad mileage. It is provided that no state shall receive less than one-half of one per cent of an opportionment.

Expenditure will be under the supervision of the Public Roads Administration of the Federal Works Agency and in accordance with the federal aid plan that has been in operation since 1916. The initiative in selection of projects rests with the state highway departments which also prepare plans, let contracts, and supervise construction, all subject to Federal approval. (The Public Roads Administration of the Federal Works Agency was formerly the Bureau of Public Roads in the Department of Agriculture.)

These funds will make possible a continuation of the federal aid program on substantially the same scale as in the past fiscal year. In that year the work in cooperation with state highway departments resulted in the improvement of 9,786 miles on rural portions of the federal aid system, 2,971 miles on the secondary or farm-to-market systems, and 725 miles were improved in municipalities.

In the program of grade crossing elimination and protection, 382 crossings were eliminated, and 86 obsolete elimination structures were reconstructed.

FEDERAL HIGHWAY ALLOTMENTS FOR FISCAL YEAR 1941

State	Regular Federal Aid	Secondary or Feeder Roads	Grade Crossings	Total
Alabama	$ 2,380,349	$ 310,480	$ 589,270	$ 3,280,099
Arizona	1,637,140	213,540	191,626	2,042,306
Arkansas	1,955,081	255,011	510,125	2,720,217
California	4,367,576	569,684	1,111,429	6,048,689
Colorado	2,080,133	271,322	376,426	2,727,881
Connecticut	718,741	93,749	248,548	1,061,038
Delaware	560,625	73,125	146,250	780,000
Florida	1,548,961	202,038	416,288	2,167,287
Georgia	2,885,623	376,386	733,109	3,995,118
Idaho	1,410,297	183,952	242,861	1,837,110
Illinois	4,650,696	606,612	1,544,707	6,802,015
Indiana	2,788,741	363,749	758,563	3,911,053
Iowa	2,915,122	380,233	819,207	4,114,562
Kansas	2,977,130	388,321	756,758	4,122,209
Kentucky	2,093,355	273,046	534,074	2,900,475
Louisiana	1,652,720	215,572	464,383	2,332,675
Maine	1,002,926	130,816	202,164	1,335,906
Maryland	944,288	123,168	300,034	1,367,490
Massachusetts	1,580,826	206,195	610,114	2,397,135
Michigan	3,465,694	452,047	970,387	4,888,128
Minnesota	3,101,454	404,538	783,436	4,289,428
Mississippi	2,017,658	263,173	465,023	2,745,854
Missouri	3,430,445	447,449	890,471	4,768,365
Montana	2,330,932	304,035	396,693	3,031,660
Nebraska	2,328,430	303,709	522,486	3,154,631
Nevada	1,462,071	190,705	146,250	1,799,026
New Hampshire	560,625	73,125	146,250	780,000
New Jersey	1,520,740	198,357	584,751	2,303,848
New Mexico	1,843,554	240,464	248,930	2,332,948
New York	5,572,118	726,798	2,000,719	8,299,635
North Carolina	2,672,689	348,612	754,096	3,775,397
North Dakota	1,735,204	228,940	462,007	2,446,151
Ohio	4,118,378	537,180	1,249,549	5,905,107
Oklahoma	2,671,591	348,468	685,148	3,705,207
Oregon	1,884,937	245,861	335,220	2,466,018
Pennsylvania	4,853,536	633,070	1,690,736	7,177,342
Rhode Island	560,625	73,125	146,250	780,000
South Carolina	1,528,126	199,321	444,883	2,172,330
South Dakota	1,851,590	241,512	401,477	2,494,579
Tennessee	2,391,758	311,968	559,502	3,263,228
Texas	7,163,707	934,397	1,630,426	9,728,530
Utah	1,294,360	168,829	193,595	1,656,784
Vermont	560,625	73,125	146,250	780,000
Virginia	2,085,702	272,048	558,591	2,916,341
Washington	1,809,062	235,965	450,343	2,495,370
West Virginia	1,245,713	162,484	391,518	1,799,715
Wisconsin	2,771,243	361,466	725,347	3,858,056
Wyoming	1,440,222	187,855	197,023	1,825,100
Dist. of Columbia	560,625	73,125	146,250	780,000
Hawaii	560,625	73,125	146,250	780,000
Puerto Rico	560,625	73,125	224,207	857,957
Total	$112,125,000	$14,625,000	$29,250,000	$156,000.000

Sand and Gravel Men Meet

Meeting in joint convention with the tenth annual gathering of the National Ready Mixed Concrete Association, the National Sand and Gravel Association observed its own twenty-fourth annual meeting in St. Louis, Missouri, on January 17, 18, and 19.

Interesting round table discussions were conducted by each organization with various joint-meetings highlighting the activities.

Opening speeches to the combined groups on January 17, included messages from J. Rutledge Hill, president of the NSGA and Jas. F. McCracken, president of the NRMCA. An address of welcome was given by Carl Brown, chief engineer, Missouri State Highway Department followed by speeches from Paul G. Hoffman, president, the Studebaker Corporation; Thomas S. Holden, vice-president, F. W. Dodge Corporation; and V. P. Ahearn, executive secretary of both organizations.

Open forum discussions of the NSGA group covered the following: trends in specifications, function of specifications, sizing sand and gravel, production of crushed gravel, loading and hauling problems at pit, railroad ballast, and stabilized mixtures.

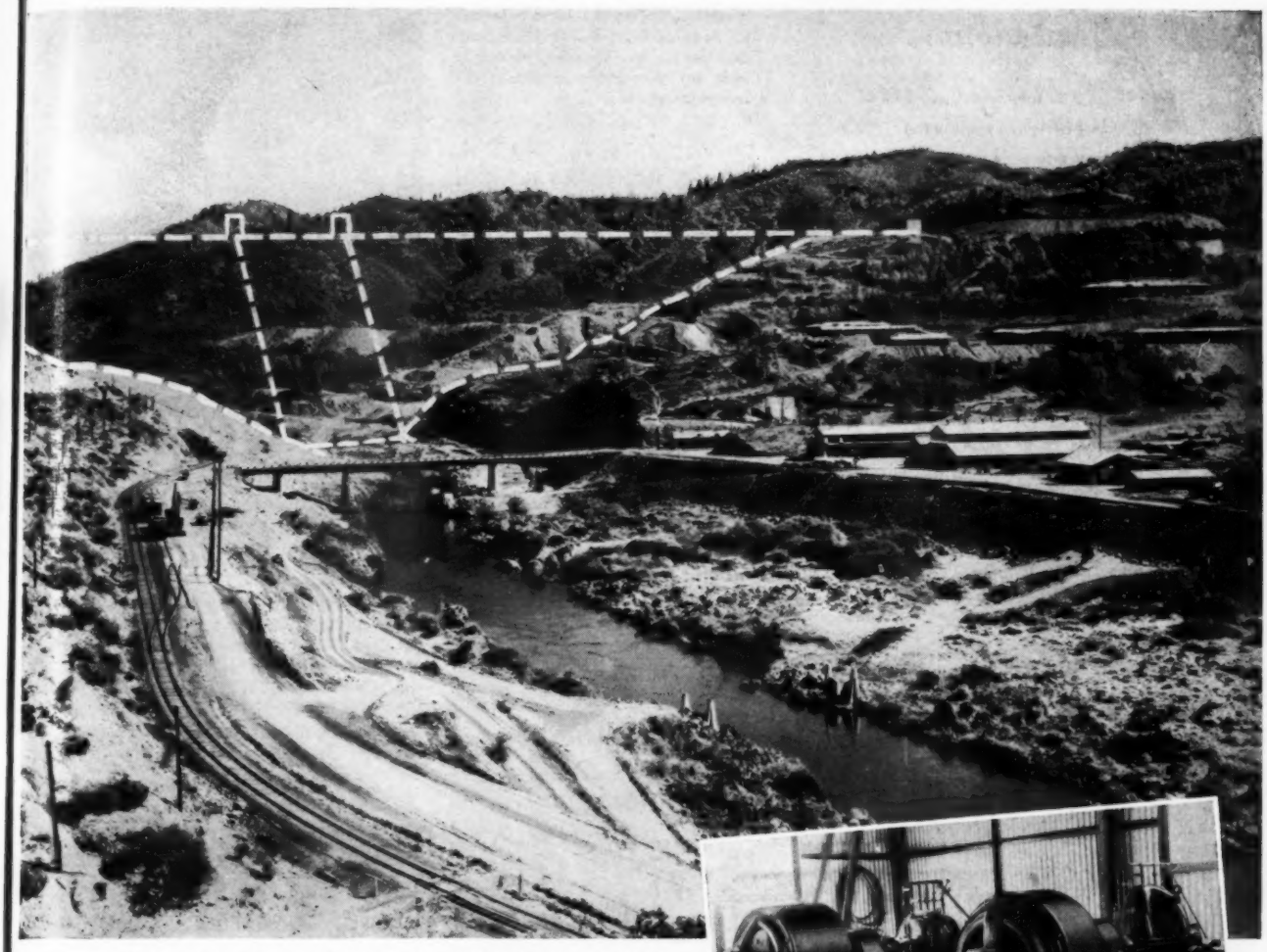
Paul P. Bird was elected president of the NSGA and J. H. Dixey president of the NRMCA for 1940.

N. J. Engineers Urge Diversion Ban

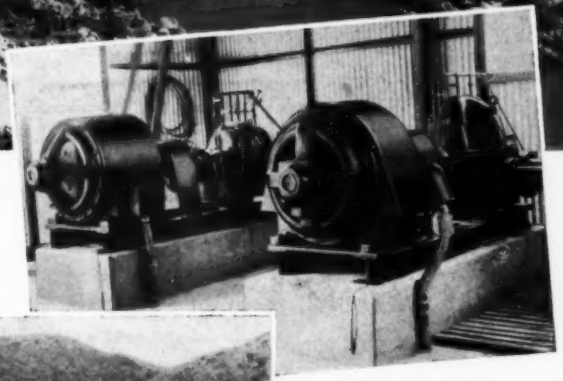
A resolution urging New Jersey's Legislature to initiate a state constitutional amendment outlawing highway fund diversion was adopted by the New Jersey Society of Professional Engineers at its recent (January 12-13) 20th annual convention in Newark. The group also went on record in support of the proposed Boston-to-Washington superhighway.

Expansion and improvement of New

(*Continued on Page 122*)



SHASTA DAM will line up as indicated. It is part of the California Central Valley project. The dam will serve for flood prevention, irrigation, power generation, navigation, and for prevention of salt water pollution of the lower delta lands



ONE OF MANY behind-scenes motor jobs at Shasta. Here G-E motors drive the pumps that lift water high up to storage tanks for construction and habitation use

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Shots from the Firing Line

(*Continued from Page 118*)

Jersey's water supplies was favored in another adopted resolution. It was urged that immediate action be taken to provide interconnections of water systems to combat water shortages resulting from insufficient rainfall.

New officers were installed as follows: President, Ernest F. Weeks; first vice president, S. Herbert Taylor; second vice president, Russell S. Wise, and secretary-treasurer, Frederick D. Braun. Next convention will be held April, 1941, in Atlantic City.

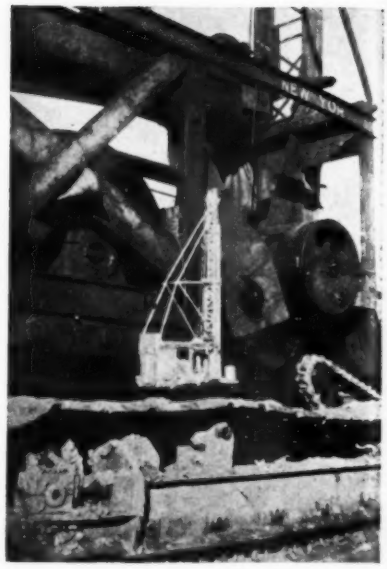
NCSA Convention

Five general sessions marked the three-day activities of the National Crushed Stone Association's 23rd annual convention. Held January 22, 23, and 24 in St. Louis, Missouri, the meeting attracted leaders of the crushed stone industry from many states.

Speeches and open discussions relating to future highway construction trends, diversion of highway funds, and the Federal Public Works Program were held during the three-day session which was opened by T. I. Weston, president of the organization.

Presiding over the five main sessions were: H. E. Rainer, Federal Crushed Stone Corporation, Buffalo, New York; J. A. Rigg, Acme Limestone Company, Fort Spring, West Virginia; H. E. Billman, president, Rock Hill Quarry and Construction Company, St. Louis, Missouri; N. E. Kelb, Ohio and Indiana Stone Company, Indianapolis, Indiana; and O. M. Graves, president, The General Crushed Stone Company, Easton, Pennsylvania.

Highlight of the convention was the annual banquet held January 23 when William H. Cameron, managing director of the National Safety Council presented the annual safety awards to the industry. Dr. Allen A. Stockdale, of the National Association of Manufacturers was principal speaker at the banquet.



● John Rajkowski, who operates a Bucyrus-Erie 42-T blast hole drill for Carey, Baxter & Kennedy, Inc., of Pennsylvania built this model of the 42-T.

Final Grade Operations at Fort Peck Dam

The last large earth-moving job at Fort Peck Dam is expected to be started and completed this year. Bids for furnishing all plant, labor and materials and performing all work required for raising the main dam structure to its final grade were received by the U. S. Engineer Office, Fort Peck, Montana, until January 30, 1940.

Although about 1,365,000 cubic yards of earth will be moved, the present total of 122,700,000 cubic yards of hydraulically- and mechanically-placed fill in the dam will be increased by only 66,300 cubic yards of glacial till, for approximately 1,298,000 cubic yards of shell material, previously placed by dredges outside the final section, will be removed by mechanical means from the slopes of the dam and placed within the final

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● This statement came from a crane operator who for 25 years has worked with all types of buckets. The bucket which won his praise is a ¾ yard Multiple Rope Williams Bucket used by F. F. Mengel Company, Wisconsin Rapids.

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section, bringing the main dam up to final grade and to the same elevation as the completed dike section.

When the scheduled earth work is completed, the top of the dam will have a maximum width of 100 feet and a minimum width of 50 feet, providing a permanent crossing, suitable for highway construction, across the Missouri River. Traffic, passing over the dam, would be 250 feet above the former river channel at this point.

It is expected that earth work will be completed before the end of 1940, for the contractor will be allowed eight months, from the time of notice to proceed, to complete work of "topping-out" the dam.

Professional Engineers Convene

Engineers from every county and most of the cities in Ohio, and from widely scattered sections of the United States, will attend the 61st annual convention of the Ohio Society of Professional Engineers, and the 5th annual convention of the National Society of Professional Engineers, February 8 to 10, in Columbus.

More than 1,500 engineers are expected at the conventions, according to Carleton S. Finkbeiner of Toledo, president of the Ohio society. Meeting schedules of both conventions are to be coordinated so there will be no conflict, and so everyone will be able to attend those sessions in which he is particularly interested.

Highlights of the program will be an address at the noon luncheon meeting of the two groups February 10 by Col. Robert S. Beightler, director of the Ohio department of highways, and an address at the 8 p.m. meeting February 8 by Hal G. Sours, assistant director and chief engineer of the department, and former president of the Ohio society.

Problems confronting the profession are to be discussed at all of the business sessions, and for that reason speakers who are not only nationally known, but who are familiar with the subjects they will discuss, have been obtained.

Objects of the societies, according to Chairman Swineford of the publicity committee, are to represent the professional engineers in all branches of their profession with a view to promoting the public welfare and to safeguard the interests of the engineers.

Extend Contra Costa Canal

Extension of the Contra Costa Canal to the vicinity of Concord and Walnut Creek, where the existing irrigation supply is inadequate for the existing development of orchards and field crops, is contemplated under a construction contract for which seven bids were received in January by the United States Bureau of Reclamation.

The lowest offer of $193,590 was submitted by Heafey-Moore Company and Fredrickson & Watson Construction Company of Oakland. The second low bid of $194,469 was submitted by the Calowell Construction Company of Bakersfield.

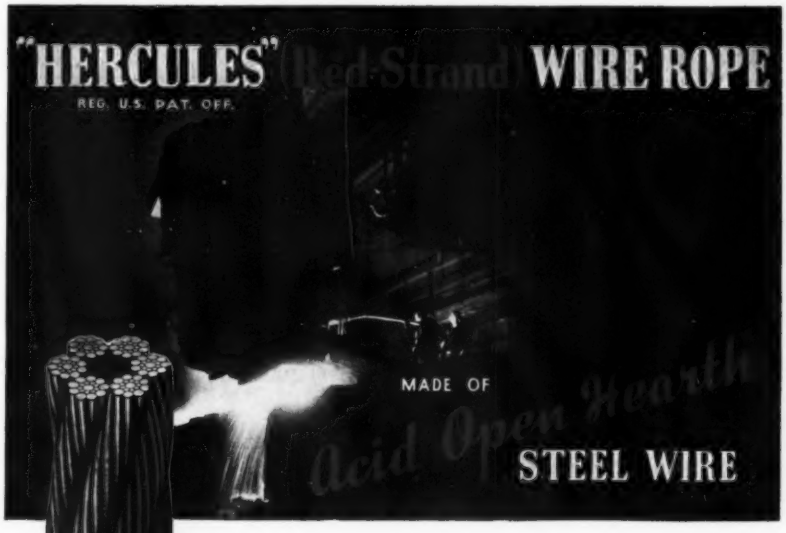
This 8½-mile section of the Contra Costa Canal, a feature of the Central Valley Project, will extend from a point northeast of Concord southerly to a point two miles north of Walnut Creek. The intensive cultivation of the area is indicated by the fact the contract is to include construction of 27 farm bridges across the canal. Other structures on this section will include four highway bridges and nine canal siphons.

The first 20 miles of the canal, except for pumping plants and the headworks, are completed and construction is proceeding on another nine-mile section from a point west of Pittsburg to near Concord. Only 8½ miles of the canal, from near Walnut Creek to a terminal reservoir near Martinez, remain to be advertised for construction.

Elect N. Y. County Assn. Officials

W. G. Kellogg of Greenwood, Steuben County, was elected president of the New York State Association of County Superintendents of Highways at its annual meeting last month at the State Office Building, Albany. He succeeds F. Ray Williams of Saratoga Springs, who was named to the association's executive committee.

L. H. M. Whitney of Fonda was



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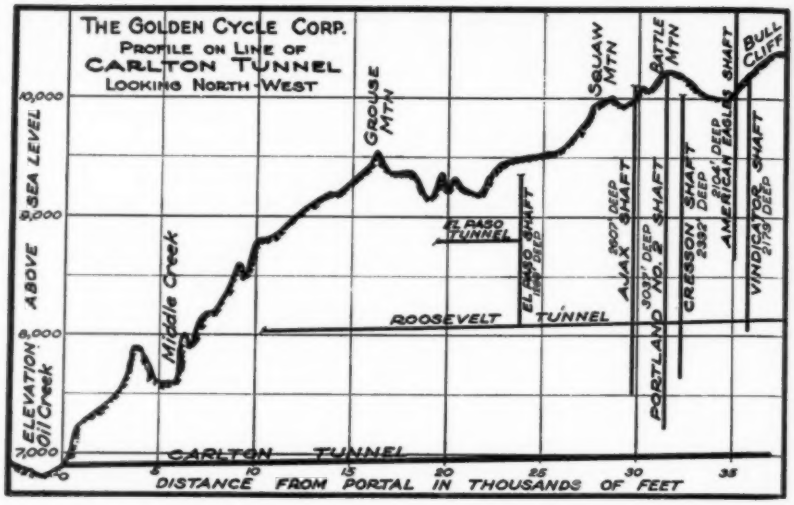
elected a new vice president. All other officers were reelected as follows: vice president, W. J. Dwyer, Cortland County; treasurer, Walter H. Bowen, Cattaraugus County; and secretary, L. P. M. Gaylord, Lewis County. New executive committee members named, besides Williams, included Harry Craig of Allegany and Walter J. O'Brien of Oneida.

The association voted to cooperate with the State Department of Public Works in completing a survey of all secondary roads in the state, necessary for federal aid. Another adopted resolution instructed the legislative committee to confer with works department officials on changes in snow removal and sanding systems and to press for legislation covering such changes. Also adopted were resolutions regretting the deaths of Fred W. Starks of Nassau and E. B. Murray of Warren.

Draining Cripple Creek Gold Field

A new prosperity is anticipated by Cripple Creek, Colorado, as the result of an ambitious engineering enterprise now underway—the boring of a tunnel 32,000 feet long and 3,300 feet under the old gold field. It will drain flooded mines and permit them to be worked again. According to studies by A. H. Koschmann, acting for the Colorado Metal Mining Fund and the U. S. Geological Survey, ore bearing strata persists far below present workings.

Carlton Tunnel is eight feet by nine in cross-section and starts from the gorge of Cripple Creek, eight miles from the city. It will require from three to four years to construct and will cost $2,000,000, including lateral connections to various mines. The bore is 1,000 feet below another deep drainage tunnel, the Roosevelt, by which means the life of this gold field had been prolonged for ten years, and is expected to permit mining for twenty to twenty-five years more. The tunnel is now about 7,000 feet into the rock and going forward at the rate of 30 to 40 feet a day.



● **Profile sketch of the Carlton Tunnel that will drain the mines in Colorado's Cripple Creek gold field.**

Under Colorado water laws, the Golden Cycle Corporation, which owns the tunnel, will also own part of the water discharged, which will be sold to farmers for irrigation.

Drilling is done by four Model DA 35 Ingersoll Rand machines mounted on a jumbo, which, besides supporting the machines carries drill steel, extra drilling machines and miscellaneous equipment. From 28 to 32 holes are drilled per round, at depths ranging from five to six feet. From two to three rounds are drilled and mucked per shift of eight hours.

The ground at present is hard and tough, and very difficult to break. Extreme care is necessary in placing the holes in order to break even a 5-ft. round. Power is furnished by the Southern Colorado Power Company, through a branch wire from the main transmission line and running from Canon City to Cripple Creek. A 1,700-cubic foot Ingersoll-Rand compressor furnishes the air both for drilling and mucking, with a 1,000 cubic foot Ingersoll Rand compressor acting as a standby. Air pressure is maintained at 110 pounds per square inch, through a 6-inch line carried in the tunnel.

Three of Golden Cycle's deepest mines have been closed until completion of the tunnel. At the Ajax mine alone, pumps were handling 4,000 gallons of water a minute, 24 hours a day, 600 feet up to the Roosevelt Tunnel.

Madera Canal Contract Let

An important step towards the delivery of a supplemental supply of San Joaquin River water to thirsty lands of Madera County was taken recently by the United States Bureau of Reclamation which opened 10 bids for the first construction on the Madera Canal, a feature of the Central Valley Project.

The Utah Construction Company, of

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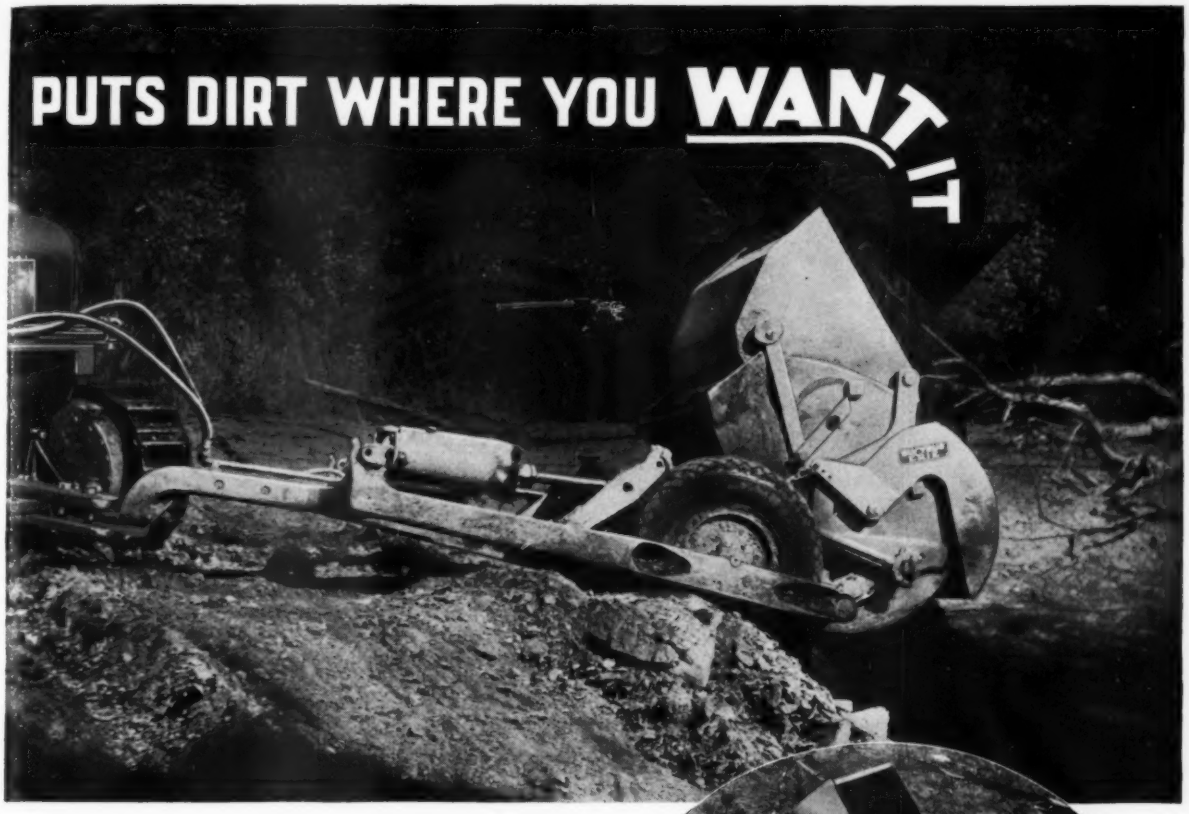

BUCYRUS-ERIE 2-Wheel Scrapers put dirt in hard-to-get-to places. This dirt-moving unit dumps backward and behind its wheels, like a dump truck. But it doesn't get stuck in the soft dirt so often found at the edge of a bank or fill. The tractor always stays on solid ground, ready to pull the scraper out of the soft dirt.

Whether you're filling in around a bridgehead or a culvert; whether you have to widen a fill; or whether you just want to dump dirt over the edge of a bank — THIS scraper will do the job for you without the help from other equipment.

For complete information on all the dirt-handling features of the Bucyrus-Erie 2-Wheel Scraper, get in touch with your nearest International Harvester TracTracTor Dealer.

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San Francisco and Ogden, submitted the lowest offer of $397,963 for building the initial 8½ miles of the canal from Friant to a point just beyond the crossing of State Highway 41 in the foothills east of Madera. Second and third lowest bids were those of Clyde W. Wood, Los Angeles, $402,431, and the United Concrete Pipe Corporation, Los Angeles, $414,759.

According to Walker R. Young, supervising engineer of the Central Valley Project, the upper reaches of the Madera Canal will be 10 feet wide at the bottom and 36 feet wide at the top of the concrete lining which will be 3½ inches thick. With a capacity of 1,000 second-feet, it will carry water about 9 feet deep.

The first 600 feet of the canal, diverting from Friant Dam, will be built under the general contract for Friant Dam, construction of which was started November, 1939. The 8½ mile section recently bid will include three siphons, three highway bridges, seven farm bridges, three overchutes, two culverts, and a wasteway. The construction job will include 580,000 cubic yards of excavation, 22,000 cubic yards of concrete placement, installing 1,770,000 pounds of reinforcement bars and erecting 57,500 pounds of bridge steel. The contractor will be allowed 500 calendar days.

The Madera Canal ultimately will extend a total distance of 40 miles from Friant Dam to Ash Slough which is a channel of the Chowchilla River in northern Madera County.

● Miners mixing purified dirt for back fill to complete the Lost Run Tunnel barrier. Dirt and mud is poured from the surface, 100 feet above, through a sluice tube.

Ohio's Famous Mine Fire Caged

By C. A. Robinson

On January 1, 1940, the Federal Government in conjunction with the Works Progress Administration and the U. S. Bureau of Mines completed its million dollar mine fire control project at New Straitsville, Ohio, closed its headquarters, released approximately 300 skilled miners and supervisory forces who had succeeded in bottling up the world's greatest mine fire.

This battle with fire started on October 1, 1936 (see complete article Excavating Engineer, March, 1937), and has been carried on in a three shift basis, except for a short period of shut down for finances early in 1939.

The task of putting this fire dragon in a cage was considered by engineers the world over as one of the most dangerous fire fighting jobs in the country, because the workers carried on under the constant menace of rock slides and of asphyxiation by four different types of gases (fire damp, white damp, stink damp and black damp) which necessitated the most expert supervision to avoid accidents or loss of life. Only one person suffered serious injury in the more than three years of dangerous underground tunnel work driven over and through falls with timbers that supported a million tons of loose rock and dirt.

Dozens of previous private attempts had been made to control the stubborn blazes, and many fortunes were sacrificed in these attempts.

Three great barriers have been completed by Uncle Sam's mine fire fighters. These barriers, three tunnels, were constructed by cutting the coal vein just outside the fire area, removing the coal and filling the incisions with noncombustible dirt and mud. Ends and sides are then sealed air tight, so when the flames reach the tunnels they burn

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A quick-loading bucket, hauled back and forth by wire cables, offers the cheapest way to handle earth and bulk materials wherever there is a haul of 100 ft. or more. Thousands of engineers and contractors now recognize this economic fact and use Sauerman Power Scrapers for their long range jobs.

The first cost of a Sauerman Power Scraper is reasonable. The machine is easy to operate; any workman can learn to run it efficiently with very little practice. The power cost and also the maintenance expense are exceedingly low per cubic yard of material handled. Wearing parts are few and are easily accessible for inspection or repair.

For the complete story get the Sauerman Catalog.

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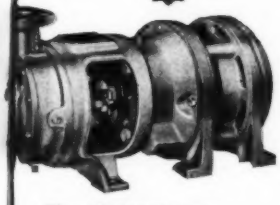

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● A truck-mounted Austin-Western 3-ton one-way snow plow owned by Greene County, Ohio, helps keep secondary roads free from snow.

themselves out against these barriers.

Many great engineers throughout the United States and Europe have visited New Straitsville in the past three years to inspect this unusual fire, while sightseers by the thousands have flocked there to view the work and see the great flames that leap up from the fires that still rage in the old mine workings inside the barriers. Engineers estimate the fire inside the barriers may continue to burn for another fifty years.

Included among the well known engineers and mining experts who supervised the work are: James R. Cavanaugh, Harrisburg, Pa.; William J. Fene, and J. H. Forbes, of the U. S. Bureau of Mines, Pittsburgh; G. J. Kane, Columbus; A. J. Laverty, New Straitsville; Clarence Kelly, Nelsonville and several others.

"There is no question, but what the work has been successful, and that the spread of the fire to the south has been halted," is the statement of Engineers Fene and Forbes of the U. S. Bureau of Mines.

The world's costliest mine fire, said to have been started in 1884 during the great coal strike of that year, has consumed more than $50,000,000 worth of the finest coal in the famous Hocking Coal fields, one of the richest deposits in the world, in an area of some 24 square miles in the vicinity of New Straitsville and an additional 30 miles of crop line.

Besides the destruction of the coal, the surface of the ground over part of the area has been rendered unfit for use, oil wells have been destroyed, families in the area have been forced to move, and the paved highway between Shawnee and New Straitsville has buckled in several places.

Annual AGCA Convention

Emphasizing the importance of the current 21st Annual Convention of the Associated General Contractors of America held at the Peabody Hotel, Memphis, Tennessee, February 5 through 8, Edward J. Harding, Managing Director of the Association has made the following statement:

"Current conditions have combined to make this convention one of the most important and useful in the Association's 22-year history.

"In 1940 major adjustments will be made in construction markets during a time of unsettled world conditions. Yet we believe we can look to the future with confidence.

"As revealed by the President's budget message to Congress, the emphasis in federal construction will shift toward national defense needs. In other governmental construction there will be a shift from federally financed to locally financed public works.

"Another adjustment will come in the increase of private construction markets, to which all present prospects point. These increases are necessary if construction is to return to former levels and provide the amount of employment necessary for continued national recovery."

Speakers who were scheduled to address the convention include: Louis Johnson, Assistant Secretary of War; Chairman Wilburn Cartwright of the House Roads Committee; Representative John J. Dempsey; Major General Julian L. Schley, Chief of Engineers, U. S. Army; John C. Page, Commissioner of Reclamation; Thomas H. MacDonald, Commissioner Public Roads Administration; W. E. Reynolds, Commissioner, Public Building Administration; and John P. Coyne, President, Building and Construction Trades Department, American Federation of Labor.

At the convention President Guy F. Atkinson, of San Francisco, was succeeded by H. B. Zachry, of Laredo, Texas, current vice president. M. W. Watson, of Topeka, Kansas, succeeded to the latter post.

OBITUARY

John West Macmeeken

John West Macmeeken, who directed centrifugal pump design for the Cameron Pump Division of the Ingersoll-Rand Company, died December 29 at his home in Easton, Pennsylvania.

Born in Scotland, Mr. Macmeeken was a graduate of Edinburgh University. He served overseas during the World War with the Canadian "Princess Pats" division. Following the war, he worked for the Montreal Light, Heat and Power Company, and for the Worthington Pump Company, Harrison, New Jersey. He joined the Cameron Pump Division in 1937. Surviving are his wife, one son and a daughter.

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Turnpike Contract

(Continued from Page 101)

Over 7,000 Feet of Pipe Placed

There are, in all, about 64 lateral drainage structures on the 4.10 mile Mashuda turnpike section requiring some 7,022 lineal feet of pipe as follows:

910 lineal ft. 18-inch interlocking style cast iron pipe
184 lineal ft. 24-inch interlocking style cast iron pipe
92 lineal ft. 30-inch interlocking style cast iron pipe
124 lineal ft. 8-inch cast iron pipe
58 lineal ft. 15-inch corrugated metal pipe
156 lineal ft. 18-inch corrugated metal pipe
38 lineal ft. 24-inch corrugated metal pipe
150 lineal ft. 36-inch asphalt coated C.M.P. No. 8 gauge
550 lineal ft. 15-inch reinforced cement concrete pipe
1872 lineal ft. 18-inch reinforced cement concrete pipe
778 lineal ft. 24-inch extra strength cement concrete pipe
100 lineal ft. 36-inch extra strength cement concrete pipe
300 lineal ft. 15-inch plain cement concrete or vitrified clay pipe
1256 lineal ft. 18-inch plain cement concrete or vitrified clay pipe
454 lineal ft. 24-inch plain cement concrete or vitrified clay pipe

An estimated 172 yards of segmented grouted rubber spillways are placed at 35 different points both right and left of the highway. Drainage outlets between the concrete slab which will soon be placed, will be taken care of by the paving contractor.

Finishing up operations called for bank sloping work which was handled with a Caterpillar tractor equipped with a LeTourneau bulldozer and an Allis-Chalmers towing an Adams leaning wheel grader. Why the Caterpillar didn't roll over as it turned up 1½ to 1 slopes is still a mystery to this writer.

Skillful handling of men and machines would undoubtedly be given as the reason for the success of Frank Mashuda and his organization on their turnpike contract. The general press of the country carried a number of stories of labor trouble on the turnpike. Frank Mashuda was not without a share of these difficulties. The trouble, it seems, lay between a local labor union and a national labor union, the former wishing to furnish all labor. Contractor Mashuda lined up all his equipment on the two exposed sides of his camp ground and told the "boys" he came to Pennsylvania to provide work—not to interfere with it—and firmly "suggested" that the quarrel be kept off his camp ground. With Pennsylvania State Police on the job the difficulties were soon ironed out and the contractor was able to carry out his agreement with the national union with respect to hiring skilled labor. No further trouble was had in this respect during the completion of the contract.

For the greatest part of the grading activities Mashuda worked three seven-hour shifts, each man working no more than forty hours per week, however. Lighting for the night shifts was provided by two Kohler light plants mounted on skids and protected

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against weather and "gadget hunters" by little sheds equipped with a stout, padlocked door. Both the 48-B and the 43-B shovels carried 1½ KW Kohler Model E lighting plants which operated two 250 watt floodlights in addition to necessary lights in the operator's cab.

On-the-Job Lubrication Performed

Constant care was given all equipment on the job. A "home-made" service truck on an old General Motors chassis made the rounds each twenty-four hours and greased and oiled each truck, tractor, shovel, wagon, roller, scraper, and auto-patrol on the job. Practically all equipment was equipped with Alemite fittings which facilitated this on-the-job servicing. The service truck carried a Diesel fuel tank, but gasoline was delivered in a separate tank truck to the equipment requiring it.

Sinclair fuels, lubricating oils and greases were used exclusively on all Mashuda equipment. Macwhyte wire lines were used on all shovels and draglines as well as scrapers.

The Frank Mashuda contracting firm consists of a partnership with brothers Stanley, Leo, Ed and Bernie. Brother Frank is the "main spring" of the works—and believe us—the wheels **do** go 'round.

Frank Mashuda, himself, was reluctant to give any summary of the job as a whole. That he had been pleased with his Pennsylvania Turnpike award despite the usual bad breaks and worries, was plainly evident. Frank Mashuda likes tough jobs and handles his equipment and men so efficiently and smoothly that he makes it all look easy.

For the Turnpike Commission, J. C. Cook was Resident Engineer on the Mashuda section with Henry D. Johnson, Jr., as Government Engineer for the Public Works Administration and Reconstruction Finance Corporation. Engineers for Frank Mashuda were John Von Gunten and George F. Nuernberger, Assistant.

Construction Outlook for 1940

(*Continued from Page 103*)

Army housing included in the defense program.

Private apartment building is expected to decrease a little; the volume has been tapering off, and the prevailing wage amendment to the National Housing Act (passed by the last Congress) has lessened somewhat the stimulus to investment housing projects with FHA-insured mortgages. However, most public housing projects will be multiple dwellings, thus producing a large net increase in apartments.

Nearly all one- and two-family houses will be private-enterprise projects in the moderate-price class. New provisions of Title I of the National Housing Act are expected to encourage development projects consisting of single houses to cost not over $2,500.

While cost index numbers of dwelling units may rise moderately in 1940, there is apt to be a preponderance of low-priced units. Consequently the 14 per cent increase estimated for dollar value of contracts may with reason be applied to the number of dwelling units. Apparently, the total number of units in new, combination and converted buildings in the Dodge report territory this year will be about 263,000; next year, according to the estimates, around 300,000.

Public Works: Highway construction as estimated in Excavating Engineer (January, 1940) will run a little ahead of 1939; all other public works classifications likely to decrease.

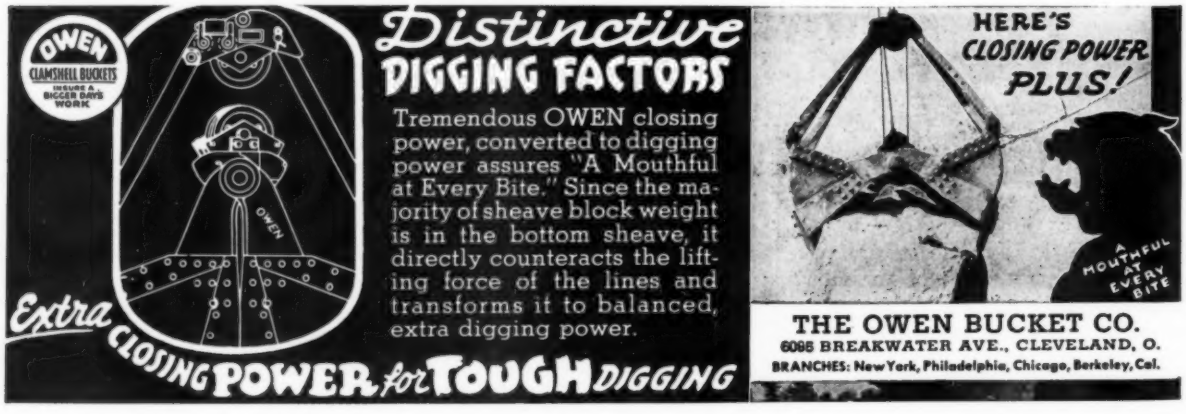
Public Utilities: The amount of construction involved in electric power plant expansion is difficult to estimate accurately; another "gambler's guess." It is also particularly difficult to estimate the distribution of power plant work as between public and private ownership; congressional authorization of a large public ownership power plant program would naturally tend to discourage private projects.

Florida's Treasure Island

(*Continued from Page 97*)

handicap of C. E. Hillyer. Mr. Hillyer came to Jacksonville, Florida from New York in 1901, and has been on most of the southern jobs since that time. He is the senior partner of Hillyer & Lovan. C. F. Lovan is the junior member of the firm. George Asbell is general superintendent, and has been associated with Mr. Hillyer for many years. William Moore is assistant superintendent and Marion Holmes is carpenter foreman.

John F. Reynolds was project engineer and was represented on the job by Roger Wilson, resident engineer. Henry Greene was the field representative of the Reconstruction Finance Corporation.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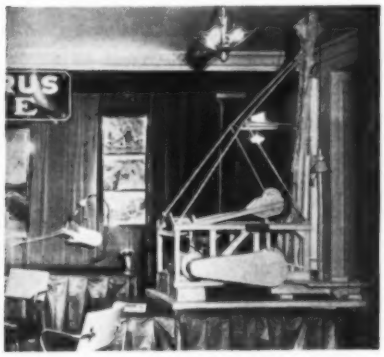
Trade notes

An exhibit that attracted much attention at the National Crushed Stone Association's 23rd annual convention at St. Louis featured the working model of a Bucyrus-Erie 29-T blast hole drill. This drill, an exact ¼-size replica, is operated by an electric motor and performs both drilling and bailing operations. The patented rubber shock absorber and the built-in tool platform on the rig created wide interest and comment among convention visitors.



J. S. Dempsey, President of The Buda Company of Harvey, Illinois, has announced the appointment of D. C. Peterson as Plant Manager in charge of all manufacturing operations, succeeding E. D. Conant who recently resigned from his position as Vice President in charge of Manufacturing.

William and Walter Schmitt, 80—22nd Street, Irvington, New Jersey, have just been appointed Sales Representatives for The Rawlplug Company, Inc., New York City, to cover the northern New Jersey territory formerly covered by P. L. Pinney. A stock of every type of Rawlplug anchoring device and masonry drill will be carried at this new Irvington address.

R. W. McKee, well known to explosive consumers of the south, has been named manager of the Birmingham, Alabama, office of Hercules Powder Company, the appointment to become effective January 1, 1940. The San Francisco office will be managed by F. George Trescher.

Charles G. Williams, formerly Vice President in Charge of purchasing and manufacturing operations for plants of the American Chain and Cable Company, Inc., has been appointed General Manager of the John A. Roebling's Sons Company, Trenton, New Jersey. Mr. Williams will assume his duties March 1, 1940.

A. J. Wadhams, Vice President and Manager of the Development and Research Division of The International Nickel Company, Inc., has announced the addition of Dr. William A. Mudge to the Technical Service Division of the New York Office.

Iron & Steel Products, Inc., Chicago, Illinois, announce the establishment of a Merchant Iron and Steel Department under the direction of J. C. Beggs, formerly of Joseph T. Ryerson & Sons, Inc.

Book reviews

Secretary of the Interior Harold L. Ickes announced the publication by the Bureau of Reclamation of a new guide on the proper use of irrigation to meet the long-felt need for practical, up-to-the-minute information on irrigation farming. By acquainting irrigation farmers, and especially new settlers, with the technique of irrigation, the new booklet is expected to help conserve both water and soil on the individual farm, benefiting the farmer and the country as a whole. More than 3,000,000 acres of desert land in the arid West have been brought under cultivation by means of irrigation through the construction of dams and canals by the Bureau of Reclamation, and approximately 17,000,000 more are irrigated by private, cooperative and State organizations. The new booklet, with 46 illustrations, will be distributed free, on request from the Commissioner, Bureau of Reclamation, Washington, D. C. P. N. 85550. Ask for Conservation Bulletin No. 2.

A new bulletin has been issued by the Sullivan Machinery Company describing various Anti-Freeze systems for air lines.

"Tannergas" is recommended for temporary air compressor installations or where electric current is not available; "Frosto" for permanent installations where electric current can be obtained; and the newly developed "Frosto Vaporizer" for portable compressors.

All types are guaranteed to prevent freezing to 70 degrees below zero. For complete description ask for Bulletin R-16, Sullivan Machinery Company, Michigan City, Indiana.

"Caterpillar" announces the release of two new folders, one on their No. 212 Motor Grader while the other features general "Caterpillar" applications.

These folders will be mailed to any one sending their name and address to the Caterpillar Tractor Company, Peoria, Illinois, and requesting Forms 5700 and 5703.

The Brooks Equipment and Mfg. Company, builders of Brooks Load Luggers and Day Pulverizers, celebrated the opening of their recently completed fireproof warehouses on January 12 and 13 at Knoxville, Tennessee. It was attended by dealers, contractors and officials in the surrounding territory, including members of concerns now represented by the Brooks sales agency in the southern district: — International Tractor, J. D. Adams, Bucyrus-Erie, Buckeye Traction Ditcher, Davey Compressor, Jaeger Machine, Linn Mfg., Rosco Mfg., Pioneer Engineering, Federal Truck and the Hercules Companies.

A new illustrated Tarmac construction and maintenance booklet has just been issued by Koppers Company, Tar and Chemical Division, Pittsburgh, Pennsylvania. Descriptions of applications and construction steps are given for prime coating, double surface treatments, retreatments and seal coats on bituminous surfaces, double surface treatments on sheet asphalt, bituminous - concrete, cement - concrete or brick, drag leveling coarse road mix of the graded aggregate and coarse aggregate types, mulch treatment, penetration pavement, soil stabilization, E-Z Mix method, and patching. There also are tables of grades and uses and a list of suggestions for the proper laying of Tarmac paving.

"All the Way with Tracks," a pictorial folder just mailed out by the Caterpillar Tractor Company, Peoria, Illinois, shows the many uses to which the five sizes of Caterpillar Diesel Tractors can be applied. A copy will be sent to you upon request.

Firms and all others who enter into contracts with the Federal government for construction work of any description will welcome the news that the third edition of "Matters of Procedure Under Government Contracts" has been offered, without cost or obligation, by writing the Fidelity and Deposit Company of Baltimore, Maryland. The author, O. R. McGuire, has endeavored to point out, in a general way, the principal things one should know and observe in the preparation of a proper record of the facts arising in the performance of one's contracts with the United States.

How to build low-cost roads for light traffic by mixing roadway soil with Portland cement and water is told in detail in a 90-page manual just issued by the Portland Cement Association, 33 West Grand Avenue, Chicago.

Soil-cement roads—which the Association characterizes as "The new answer to the light traffic road problem"—require careful laboratory analyses and tests of soils coupled with studied construction procedure to assure their success. What these tests and procedures consist of form the body of the manual. Although scientific, the manual points out that both laboratory and construction procedures are simple.

The handbook also indicates uses for soil-cement mixtures other than for road construction.

How "low-cost airports can be built anywhere" is graphically told and illustrated in a new airport folder published by R. G. LeTourneau, Inc. Initial land

clearing, levelling, finished grading, maintenance, and hangar erection are shown as they are handled the LeTourneau way with Dozers, Carryall Scrapers, Rooters, and Cranes. Write to R. G. LeTourneau, Inc., Peoria, Illinois for a copy.

The Michigan Technic has published a series of articles in a booklet, entitled "Engineering: A Profession," which was written for young engineers faced with a decision as to what type of work they wish to follow. The authors of the articles on Research, Design, Consulting, Construction, Production, Administration, Sales, Teaching and What Industry Expects are experts in their respective fields and hope their experiences will aid young engineers in making wise decisions. Write to the Michigan Technic, College of Engineering, University of Michigan for copies.

The various uses and many interesting photos of the Independent Pneumatic Tool Company's new 5½ inch, 17 ounce, rotary air grinder "Bantam," are given in a circular recently issued.

All grinding wheels and accessories available are pictured and priced to give an idea of the versatility of this tool. This circular is colorful and instructive and gives the pertinent information in an easy to read style. It can be obtained by writing the Independent Pneumatic Tool Company, 600 West Jackson Blvd., Chicago, and requesting circular P20.

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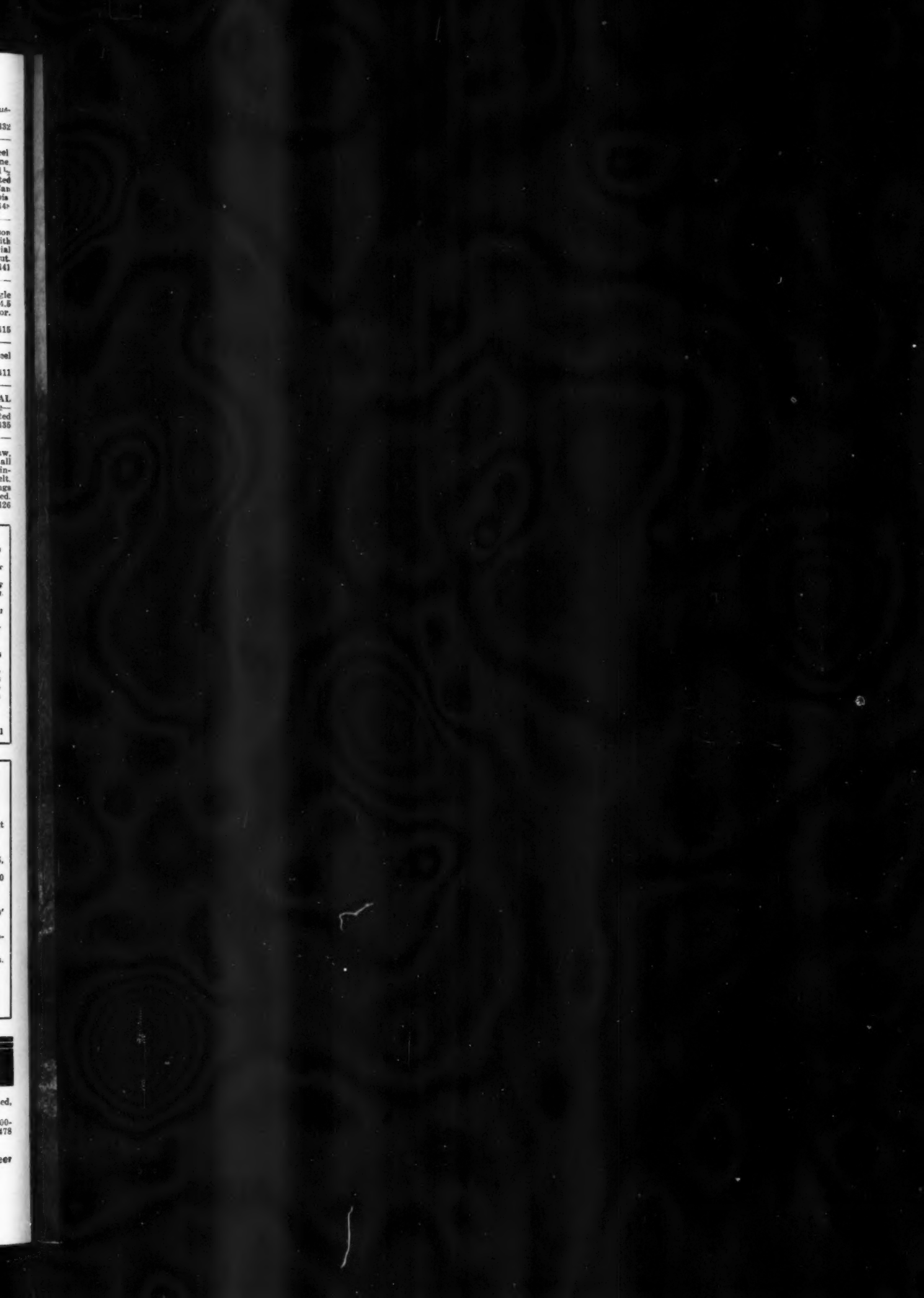
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